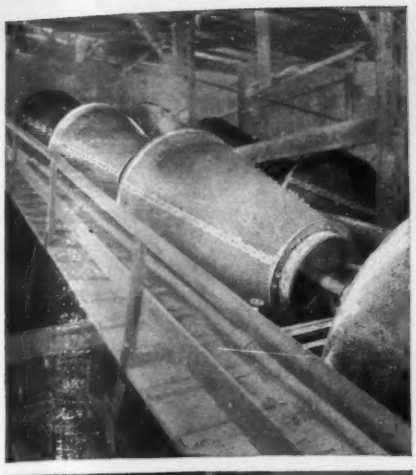
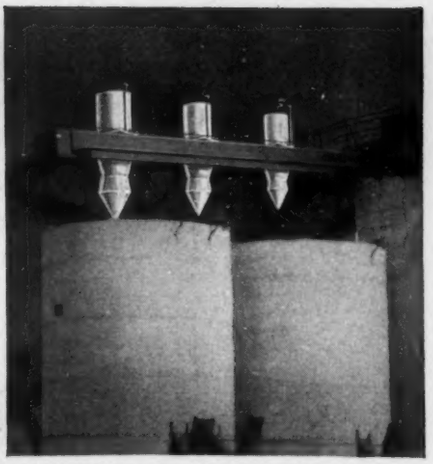
Rock Products

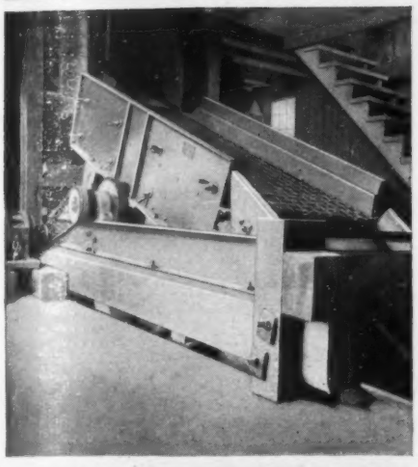
and

CEMENT and ENGINEERING NEWS (Est. 1896)

THE OLDEST PUBLICATION IN ITS FIELD AND THE RECOGNIZED AUTHORITY







HANDLING— PREPARATION EQUIPMENT by LINK-BELT

The complete Link-Belt line includes every form of mechanical handling and preparation equipment—for washing, grading, elevating, conveying; as well as excavating.

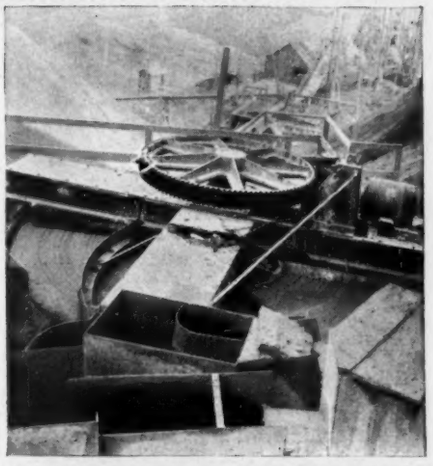
Link-Belt has brought to the highest point of standardization, commensurate with sound engineering, the elements of handling and preparation equipment, and the positive power transmitting units for them. Link-Belt designs offer economy and flexibility of layout, with equipment developed for specialized services. Send for catalog No. 1240.

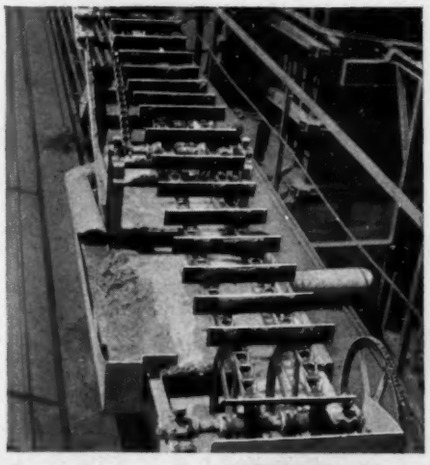
LINK-BELT COMPANY

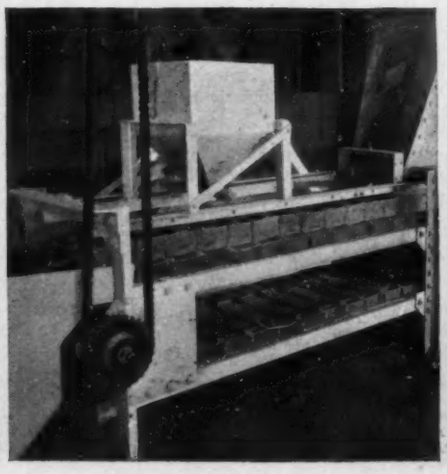
The Leading Manufacturer of Equipment for Handling Materials and Transmitting Power

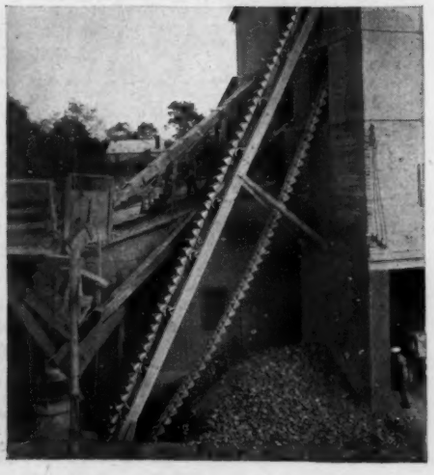
CHICAGO PHILADELPHIA
INDIANAPOLIS ATLANTA
SAN FRANCISCO TORONTO

Offices in Principal Cities 5377A









Rock Products

With which is Incorporated **CEMENT and ENGINEERING NEWS** Founded 1896

Entered as second-class matter, Jan. 30, 1936, at the Chicago, Ill., postoffice, under the Act of March 3, 1879.

(Published Monthly)

October, 1936

TABLE OF CONTENTS

Perhaps There Are Some Good Features in the Robinson-Patman Act 35-37

Makes Instead of Buying Power 38-40
Columbia Quarry Co. Installs Latest in Diesel-Powered Generators

Two Million Ton Order for Aggregates 41-47
How Tygart River Reservoir Dam Requirements Are Produced. By Max E. Boyer

Limestone Plant's Evolution 48-49
Columbia Quarry Company's Valmeyer Operation Develops To Meet Demand for Specialties

A Simplified Method for Chemical Calculations as Applied to the Lime Burning Process 50-52
By H. M. Rivers

Mountain of Nova Scotia Gypsum to World Markets 53-60
Victoria Gypsum Co., Ltd., Has Ideal Facilities. By R. A. McMullin

How To Install Dust Control Exhaust Piping 61
By C. A. Snyder

Texas Cement Plants Adding Latest Improvements 62-65
Republic, at San Antonio, Adds Water-Cooled Jackets on Mills, Air Separation; Lone Star, at Houston, Installs Three-Compartment Mills with Air Separators; Trinity, at Fort Worth, Adds Recuperators. By Bror Nordberg

Lime Kiln Heat Balance 68-70
By Victor J. Azbe

Standard and Special Units by Vibration 78-79

Departments

Editorial Comments 35-37
Chemists' Corner 50-52
Hints and Helps 66-67
Lime Producers' Forum 68-70
Digest of Foreign Literature 71
Financial News and Comment 72-73
Traffic and Transportation 74-76
Cement Products 78-79
New Machinery and Equipment 80-83
News of the Industry 85-87
Classified Directory of Advertisers 94, 96, 98

INDEX OF ADVERTISERS

Allis-Chalmers Mfg. Co... 26
American Fdy. Equip. Co.105
American Manganese Steel Co. 31
American Pulverizer Co. .....Inside Back Cover
American Steel & Wire Co. 19
Atlas Powder Co..... 20
Audubon Wire Cloth Corp. 103
Austin-Western Road Machy. Co. 9
Babcock & Wilcox Co. .....Front Cover
Bacon, Earle C., Inc..... 86
Birdsboro Steel Fdy. & Machine Co. 110
Bonnot Company 102
Bradley Pulverizer Co....105
Broderick & Bascom Rope Co. 6
Buchanan, C. G., Co.....110
Bucyrus-Monighan Co.... 32
Carnegie-Illinois Steel Corp. 21
Cement Process Co.....110
Chain Belt Co..... 13
Chicago Perforating Co...110
Classified Advertisements 111-112-113
Classified Directory of Advertisers.....94, 96, 98
Cleveland Rock Drill Co..114
Cleveland Wire Cloth & Mfg. Co. 101
Courchesne, A., Inc.....104
Cross Engineering Co....109
Davis Emergency Equipment Co., Inc..... 85
Dempster Bros., Inc.....104
Dixie Machy. Mfg. Co....105
Dorr Company 24
Eagle Iron Works 108
Easton Car & Const. Co..101
Ehrsam, J. B., & Sons Mfg. Co. 110
Ensign-Bickford Co. 88
Fate-Root-Heath Co. 5
Flexible Steel Lacing Co..102
Frog, Switch & Mfg. Co..109
Fuller Company 12
General Electric Co..14-15, 33
Goodrich, B. F., Co.....3, 97
Goodyear Tire & Rubber Co. 11
Gruendler Crusher & Pulv. Co. 106
Gulf Refining Co..... 95
Haiss, Geo., Mfg. Co., Inc. 87
Hardinge Company, Inc..107
Harrington & King Perf. Co. 105
Hayward Company 109
Hazard Wire Rope Co....109
Hendrick Mfg. Co.....104
Hercules Powder Co..... 27
Hetherington & Berner, Inc. 104
Ingersoll-Rand Co. ....Inside Front Cover
Jaeger Machine Co.....107
Jeffrey Mfg. Co.....109
Koehring Company 30
Koppel Industrial Car & Equip. Co. 86
Leschen, A., & Sons Rope Co.....Inside Back Cover
Lewistown Foundry & Machine Co. 110
Link-Belt Company ...1, 107
Manganese Steel Forge Co. 103
Manhattan Rubber Mfg. Divn. of Raybestos-Manhattan, Inc. 109
Manitowoc Engr. Works.108
Marietta Concrete Corp..102
McLanahan & Stone Corp. 108
Merrick Scale Mfg. Co....100
Morris Machine Works...108
National Crushed Stone Assn. 92
National Sand & Gravel Assn. 89
National Wire Cloth Co..108
New Holland Machine Co.104
Nordberg Mfg. Co..... 10
Owen Bucket Co.....106
Page Engineering Co..... 99
Pennsylvania Crusher Co. 93
Pioneer Gravel Equip. Mfg. Co. 29
Plymouth Locomotive Works 5
Productive Equip. Corp..110
Raymond Bros. Impact Pulverizer Co. 34
Richardson Scale Co..... 99
Robins Conveying Belt Co. 109
Roebling's, John A., Sons Co. 25
Ryerson, Jos. T., & Sons, Inc. 110
Sauerman Bros., Inc.....107
SKF Industries, Inc..... 8
Sly, W. W., Mfg. Co. .....Inside Back Cover
Smidth, F. L., & Co..... 28
Smith Engineering Works .....Back Cover
Socony-Vacuum Oil Co.17-18
Sprout, Waldron & Co....110
Stulz-Sickles Co. 108
Sturtevant Mill Co.....106
Texas Company 4
Thew Shovel Co..... 23
Timken Roller Bearing Co. 16
Traylor Engr. & Mfg. Co. 7
Tyler, W. S., Co.....109
United States Steel Corp. Subsidiaries 19, 21
Universal Crane Co..... 23
Universal Concrete Pipe Co. 107
Universal Vibrating Screen Co. 105
Used Equipment..111-112-113
Western Precipitation Co.103
Whiting Corp. 106
Wickwire Spencer Steel Co. 87
Wilfley, A. R., & Sons, Inc. 106
Williams Patent Crusher & Pulv. Co. 100
Williamsport Wire Rope Co. 22

(Rock Products is indexed in the "Industrial Arts Index," which can be found in any Public Library)

Telephone Central 0670

TRADEPRESS PUBLISHING CORPORATION
205 West Wacker Drive, Chicago, Illinois, U. S. A.
NATHAN C. ROCKWOOD, President; J. L. FRAZIER, Secretary

Telephone Central 0670

NATHAN C. ROCKWOOD, *Editor*
BROR NORDBERG, *Associate Editor*
Contributing Editors
DR. F. O. ANDEREGG, Newark, Ohio
VICTOR J. AZBE, St. Louis, Mo.
EDMUND SHAW, Los Angeles, Calif.

RAY KEATS, *Assistant Editor*
J. A. FOXWORTHY, *Readers' Service*

GEORGE C. WILLIAMS, *General Manager*
GEO. M. EARNSHAW, *Eastern Manager*
56 W. 45th St., New York City
Tel. Murray Hill 2-3006
850 Euclid Ave., Cleveland, Ohio. Tel. Cherry 4050
L. C. THAON, *Western Representative*
Chicago. Tel. Central 0670
JOS. J. KOLAR, *Copy and Research Manager*

SUBSCRIPTION—Two dollars a year to United States and Possessions. $2.00 a year to Canada and $4.00 to foreign countries. Twenty-five cents for single copies

TO SUBSCRIBERS—Date on wrapper indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address

GOODRICH RUBBER "SINGS MAMMY" TO A MILLION MOTHERLESS CHICKS

"HAWKINS Million $ Hen" is the most modern brooder on the market . . . its "mother's breast" is Goodrich rubber, kept at exactly the 105° that nature gives a mother hen. And this unusual rubber has been made similar to a hen's breast in other ways—it is as soft, as non-porous, and more sanitary, and because of special compounding it holds its exact heat without becoming "tacky," without deteriorating.

The chick stands, as he would under a hen's feathers, and his back (where his lungs are) just touches the heated rubber pad. Results of this brooder are healthier chicks, less mortality, chickens ready for market sooner, and a more tender meat. Results for the brooder manufacturer are huge sales, mounting profits.

Here is one more in the long list of new products, new profits made possible by the unusual developments Goodrich has achieved in rubber. As Goodrich compounds it, rubber is serving purposes and setting records unheard of a few years ago.

As for the better-known rubber products such as belting and hose, remember that the skill, special compounds, unique equipment developed for the exceptional uses of rubber, are employed to make these products a constantly better value. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

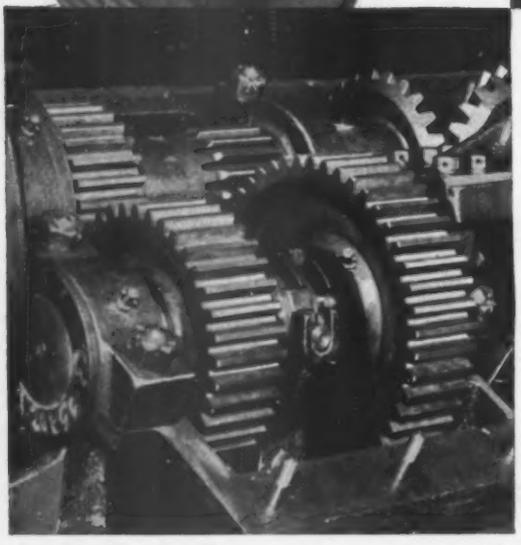
Goodrich

ALL *products problems* IN RUBBER

Put it up to him

TEXACO-TRAINED

..He can help you *reduce Gear noise* immediately!



WHEN he tells you that you can quiet the noise of gear teeth and reduce the wear, the Texaco-Trained man is referring to Texaco Crater. He knows Crater has done it again and again.

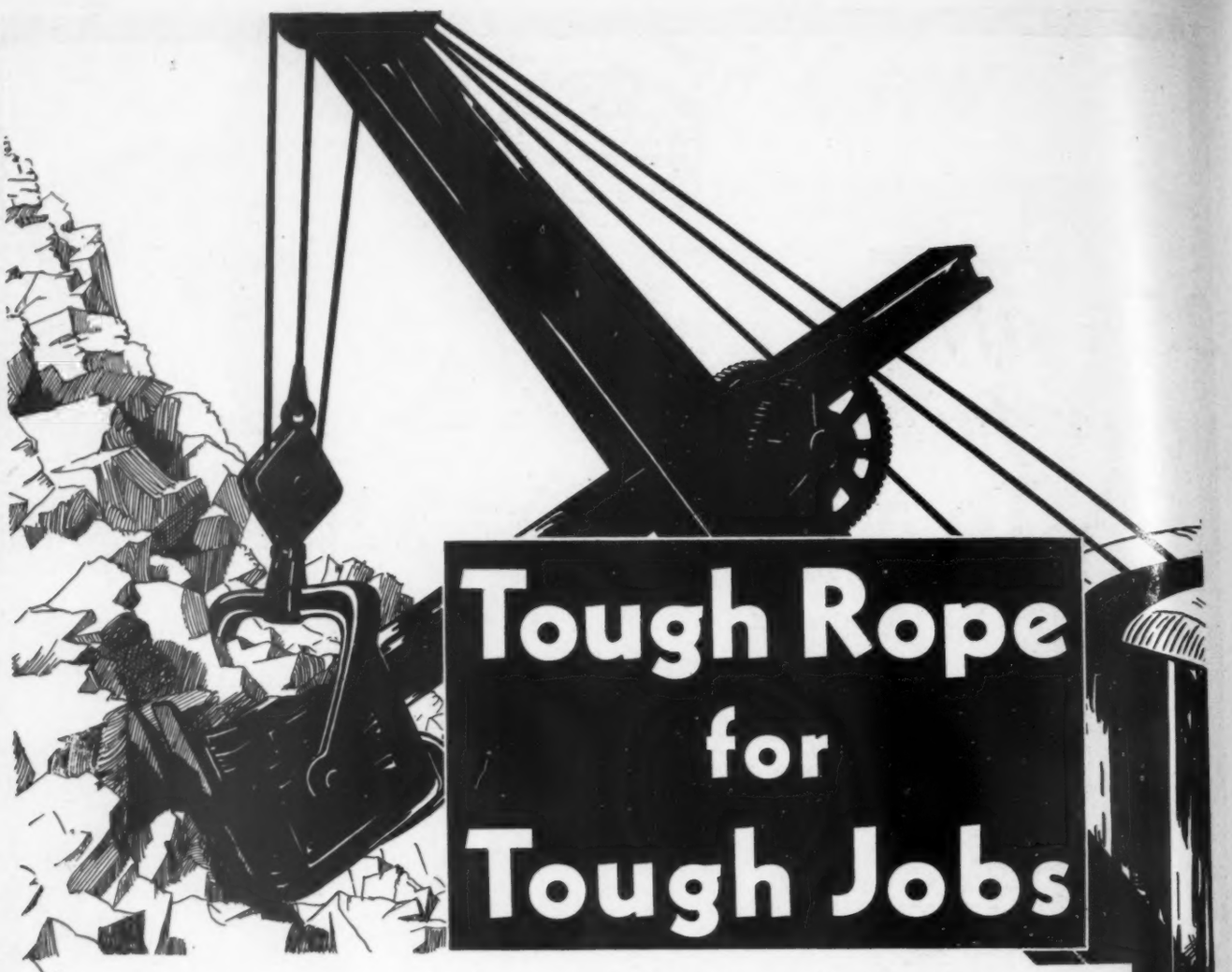
Crater Compound cushions gear teeth, in a pressure-proof, wear-defying film that resists the wiping action of gears in mesh. It adheres, stays on, giving two and three times longer life than ordinary lubricants. Crater immediately subdues the noise by stopping the undue metal-to-metal wear. The Texaco-Trained representative will be glad to provide practical engineering service to prove the economies of Texaco Products.

THE TEXAS COMPANY
135 East 42nd Street, New York City
Nation-wide distribution facilities assure prompt delivery

WRITE FOR THIS . . . 32 pages of money-saving information for all who operate wire rope or gears. Shows where to use Crater, and how. Illustrates simple, easily-built rigs for quick and easy application. FREE to all.

USED ON WIRE ROPE, Crater coats each individual wire with a tough, weather-proof and corrosion-resistant film that lubricates and preserves. Keeps rope flexible, the hemp core from rotting out.

TEXACO *Industrial Lubricants*



Tough Rope for Tough Jobs

"Flex-Set" Preformed Yellow Strand is especially recommended for hoist line, crowd rope, rack rope and swinging lines on power shovels; for dragline and hoist line on dragline machines; for holding line and closing line on clam shell buckets.

Almost any wire rope will serve well enough in some places—but where the going is rough—*and tough*, there "Flex-Set" Preformed Yellow Strand shows its super-quality—its unquestioned ability to *"take it,"* and *"like it."*

This is the same Yellow Strand that has been "taking it" successfully for many years—the same specially drawn wire, tested and selected—the same careful manufacture by the same company that is now *60 years young.*

The difference results from preforming, which sets the strands to the helical form they maintain permanently in the finished rope. Thus "Flex-Set" Preformed Yellow Strand is largely pre-broken in. It is limp—easy to handle and install—highly resistant to kinking, fatigue and wear.

With these properties, how could it be other than economical? Try it!

BRODERICK & BASCOM ROPE CO., St. Louis

Branches: New York, Chicago, Seattle, Portland, Houston; Factories: St. Louis, Seattle, Peoria

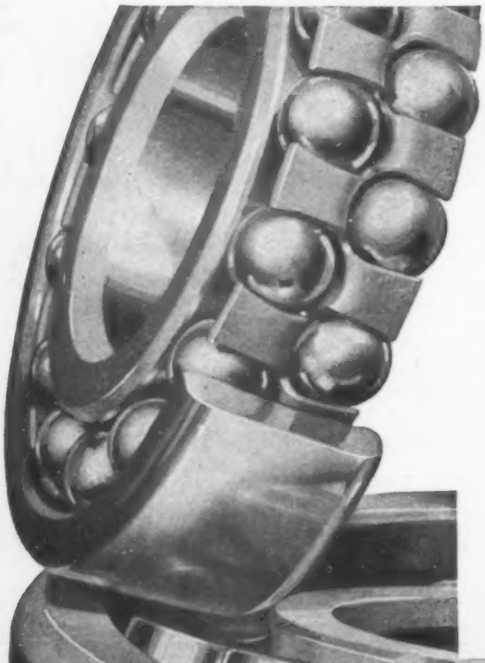
U-9

"Flex-Set" Preformed YELLOW STRAND

SKF-EQUIPPED
BUILT BY
THE AUSTIN-WESTERN
ROAD MACH'Y CO.

SKF RUN FREE FROM GRIT

on crushing and screening plants

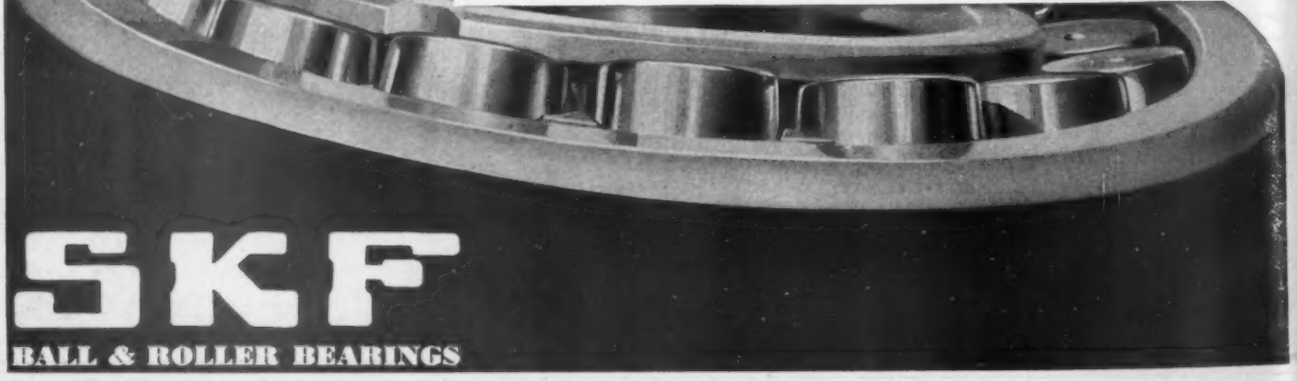


Working in an atmosphere constantly filled with particles of abrasive grit, crushing and screening plants need bearings that exclude dust as well as retain lubricant.

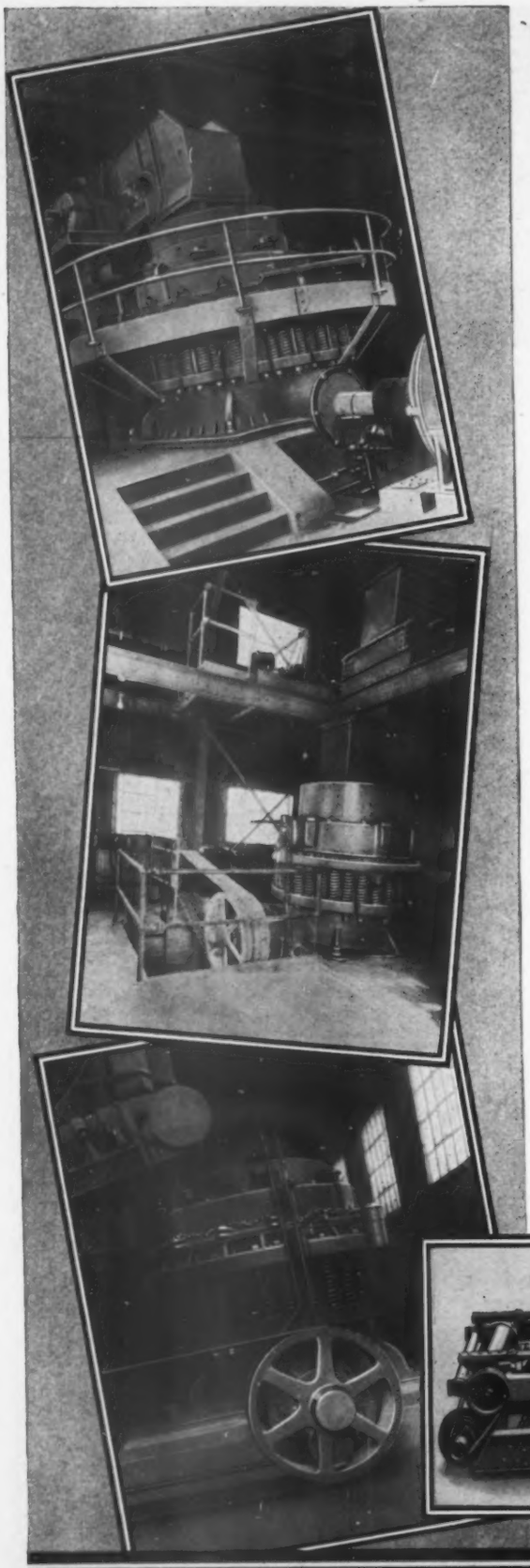
SKF Bearings in carefully machined housings not only run free from dirt and moisture, but reduce the quantity of oil or grease required to an occasional lubrication. Furthermore, they show hardly a trace of wear from the unusual and varying loads to which they are subjected year after year. If *you* have a tough job, tackle it with SKF.

SKF INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILA., PA.

3698



SKF
BALL & ROLLER BEARINGS



Better Equipment for Greater Profits

Now is the time to look toward the future. There is every evidence of increased construction and road building programs. This means greater production of materials which in turn requires new and modern equipment if such materials are to be produced profitably.

With the growing demand for finer crushed and better screened products, Nordberg is in a position to meet these needs. The Symons Cone Crusher with its great capacity reduces crushing costs. The Symons Screen with its level screening action sizes closer and meets the most rigid material specifications. Keep abreast of the times by choosing Nordberg crushers and screens when new equipment is being considered.

NORDBERG MFG. CO.

MILWAUKEE, WIS., U. S. A.

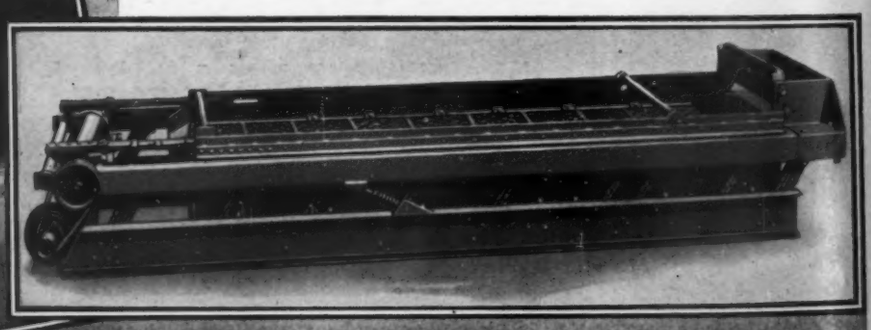
NEW YORK CITY
50 E. 42nd St.

LOS ANGELES
Subway Term. Bldg.

LONDON
Bush House

TORONTO
Concourse Bldg.

MEXICO CITY
Edificio Cook No. 413



CRUSHERS - SCREENS

WHERE SKILL IS IMPORTANT — building large hose requires expert craftsmanship, from the tube to the cover of the hose. These veteran craftsmen are applying flat steel wire employed in certain types of rough-bore hose.

NO JOB FOR AMATEURS — building large-diameter sections of Goodyear Hose — no matter in what type of service the hose is to be used — requires the highest type of hose-building art.

THE ONE THING NO PRICE LIST SHOWS

counts most in buying large industrial hose

THERE is something far more important than price or even specifications that you should investigate, if you use hose for dredging, sand suction, oil well rotary drilling, or the loading or fueling of ships with oil.

It is something no draftsman can blueprint, no cost accountant can figure. It is the skill and knowledge and craftsmanship of the men who build this huge hose that must be built by hand.

The cornerstone of quality

Here at Goodyear, the youngest in our Number One Crew of seven men who build these rubber monsters, layer by layer, is a mere babe who has been making hose for only 22 years! The experience of the seven totals 191 years — an average of more than 27 years per man!

Year by year for more than a quarter-century, these men have been acquiring the knack and "know how" and teamwork that comes with long practice. Their inimitable skill is the very corner-stone of quality — the priceless ingredient that fuses good engineering and good materials into good hose.

Job-fitted by the GTM

That is why you find Goodyear Hose on all types of jobs the world over — because experience proves its superior construction makes for far longer service at far less cost. And economy is further assured by the fact that Goodyear Hose is individually specified to each job on careful analysis by the G. T. M.—Goodyear Technical Man. This practical authority will gladly consult with you on your special hose requirements. Just write Goodyear, Akron, Ohio, or Los Angeles, California — or the nearest Mechanical Rubber Goods Distributor.

BELTS
MOLDED GOODS
HOSE
PACKING
Made by the makers of Goodyear Tires

GOODYEAR

OUR CREED — to build only products worthy of THE GREATEST NAME IN RUBBER

SOME USERS OF FULLER ROTARY FEEDERS

ALLENTOWN PORT. CEMENT CO.
DEWEY PORTLAND CEMENT CO.
MISSOURI PORT. CEMENT CO.
COPLAY CEMENT MFG. CO.
CANADIAN GYPSUM CO.
ALPHA PORTLAND CEMENT CO.
AMERICAN MACH. & FDRY. CO.
VALLEY FORGE CEMENT CO.
SOUTHERN MINERAL PROD. CO.
MARQUETTE CEMENT MFG. CO.
NORTHWESTERN PORT. CEM. CO.
MATHIESON ALKALI CO.
MICHIGAN ALKALI CO.
U. S. GYPSUM CO.
CRESCENT PORT. CEMENT CO.
CALIFORNIA PORT. CEMENT CO.
COLGATE-PALMOLIVE-PEET CO.
SIX COMPANIES OF CALIFORNIA.
HURON PORTLAND CEMENT CO.
PETOSKEY PORT. CEMENT CO.
LONE STAR CEMENT CO.
EDISON CEMENT CORP.

For Service and Accuracy

SERVICE—Several years of the most gruelling operation in exacting cement mill practice have proved beyond all doubt that the Fuller Rotary Feeder assures resistance to the wearing effects of abrasive materials.

ACCURACY—Flooding has been eliminated wherever this feeder has been installed. This feature, combined with uniform volumetric efficiency, insures highest possible accuracy, particularly desirable on such service as tube-mill feed, for both preliminarily prepared product and regrinding.....kiln feed for either raw material or coal .....also for blending, mixing, and proportioning operations on all classes of dry pulverized or granular materials.

If you have a feeder problem, we welcome the opportunity of going over the situation with you.

FULLER COMPANY

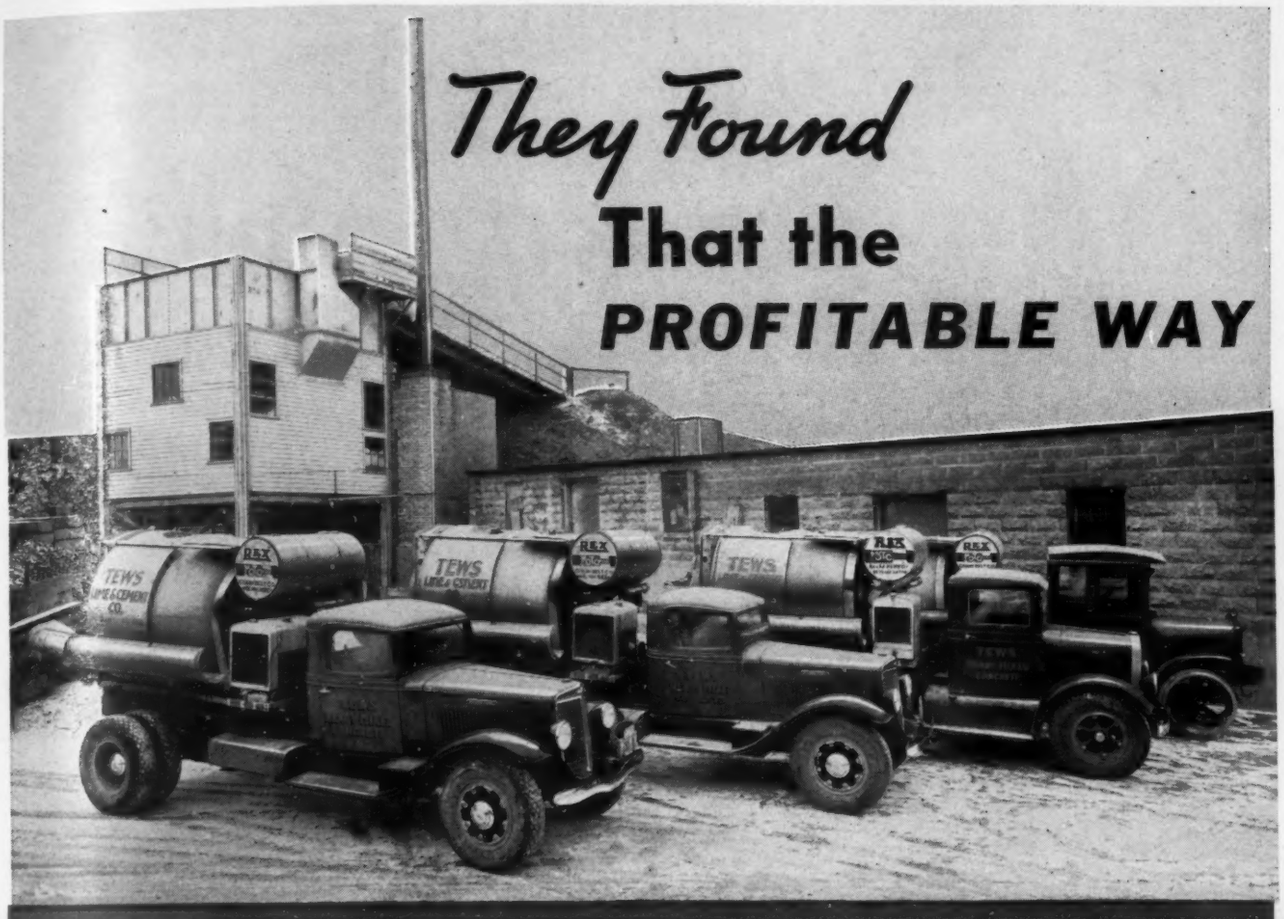
CATASAUQUA, PENNSYLVANIA

Chicago: 1118 Marquette Bldg.
San Francisco: 320 Chancery Bldg.

F-1

FULLER-KINYON, FLUXO, AND AIRVEYOR CONVEYING SYSTEMS · · · ROTARY FEEDERS AND DISCHARGE GATES
ROTARY AIR COMPRESSORS AND VACUUM PUMPS · · · AUTOMATIC BATCH WEIGHERS · · · BIN SIGNALS

They Found That the PROFITABLE WAY to Merchandise Sand, Gravel, Stone and Cement Is with Rex Moto-Mixers



4 of the 10 Rex Moto-Mixers at the Tews North Plant

No business can escape change. The Tews Lime and Cement Company of Milwaukee, Wisconsin, have based their business success on that fact. Forty years ago, their business was primarily in wood lath and lime. Today, one carload of lath lasts for months.

In 1933, when their cement and aggregate business began to slump, they did something about it. The next season they were ready with a ready-mixed concrete plant.

From a start of two units in 1934, today they are operating two plants and a fleet of twelve units, *ten* of them Rex Moto-Mixers. Their experience showed that Rex Moto-Mixers and Agitators mix and deliver concrete profitably, more efficiently and at a lower operating cost.

You, too, can get bigger profits from your sand, gravel, stone and cement by mixing and delivering concrete with Rex Moto-Mixers and Agitators. Investigate this proved path to quick profits by sending for the book "Rex Moto-Mixers and Agitators."

CHAIN BELT COMPANY OF MILWAUKEE

REX Moto-Mixers

READY-MIXED CONCRETE

Send today for a copy of the book—"Rex Moto-Mixers and Agitators." It describes the modern way to secure a profitable method of selling cement and aggregates. It illustrates the modern Rex Moto-Mixer features.

CHAIN BELT COMPANY
1649 W. Bruce Street Milwaukee, Wis.


Notes
Made on factory trip to
Nazareth Cement Company
Type Y 178, 400-hp, 720-rpm induction motor driving Raymond mill
Type MT 553, 75-hp. 720-rpm GE induction motor driving stone dryer
Type MT 564 200-hp, 720 rpm, GE induction motor operating rock crusher
One of two GE 200-hp, 600-amp motor-generator sets and switchboard, supplying direct current for 19 GE synchronous-motor fields and miscellaneous sets
Type TS, 500-hp, 180-rpm GE synchronous motor direct connected to Ingersoll-Rand air compressor.

GENERAL

FACTORY TRIP REVEALS

Nazareth Cement Co.

Increases Capacity and Efficiency with

GENERAL ELECTRIC EQUIPMENT

THE Nazareth Cement Company, Nazareth, Pa., pioneered in the complete electrification of the cement mill and, as a result, was able to operate efficiently at times when costs had to be kept at the absolute minimum.

The mill capacity was increased through the use of large synchronous motors designed by General Electric. These low-speed motors, direct connected to grinding mills, reduced maintenance costs and friction losses and provided greater safety. On the 15-tube mills the maintenance services of two men (full time) were made available for other purposes.

Further benefits which this progressive manufacturer receives from synchronous motors include greater flexibility in starting, and the maintenance of a unity-power-factor load in the plant. This improves the regulation and general operating efficiency of the mill.

General Electric not only manufactures a complete line of electric apparatus for cement mills and rock-products plants, but will gladly assist you in selecting electric equipment. Write for details and specific information on the latest types of apparatus. General Electric Company, Schenectady, N. Y.

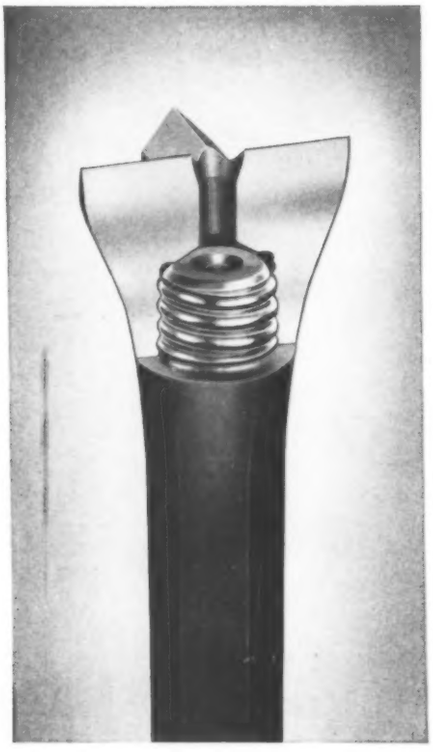
SAVE MONEY WITH G-E SYNCHRONOUS MOTORS

For safe, economical, and dependable cement-mill drives for grinders, pulverizers, pumps, and compressors, choose General Electric synchronous motors. They are designed to fit the needs of your particular jobs

011-125

E L E C T R I C

IF IT ISN'T



IT ISN'T A TIMKEN BIT

Streamlining distinguishes Timken Bits from all other types of removable bits. It is a mark of identification that cannot be mistaken. Timken streamlined construction makes just as favorable a difference in performance as it does in appearance. It is one of the most important of several important reasons why Timken Bits drill faster and last longer.

The basic factor of Timken streamlining is the shoulder on the steel, against which the base of the bit fits so snugly that the joint is hardly visible.

Through this shoulder the hammer blows are transmitted to the body of the bit uniformly at every point. This uniform distribution of the driving force produces an astonishing increase in drilling speed.

None of the hammer impact is taken on the threads which, consequently are not liable to injury from this cause. Result, longer bit life.

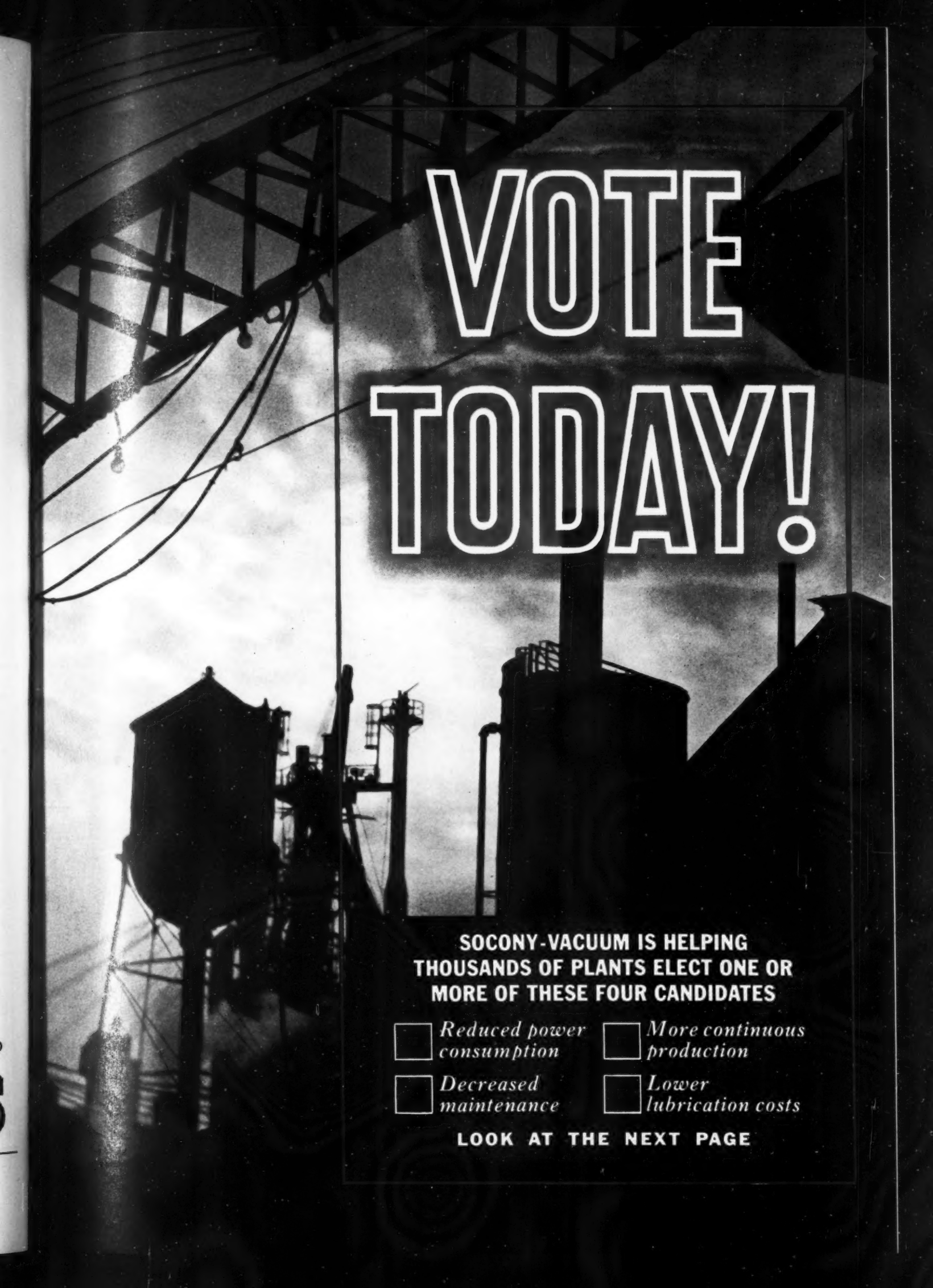
A secondary—but equally desirable—advantage of streamlining is the fact that there is no obstruction for chips to lodge behind and thus wedge the steel in the hole. Easy withdrawal after drilling is therefore assured at all times.

If your removable bits are not streamlined you are not getting all of the advantages you should have. Buy Timken Bits.

COMPLETE STOCKS MAINTAINED IN
PRINCIPAL DISTRIBUTING CENTERS

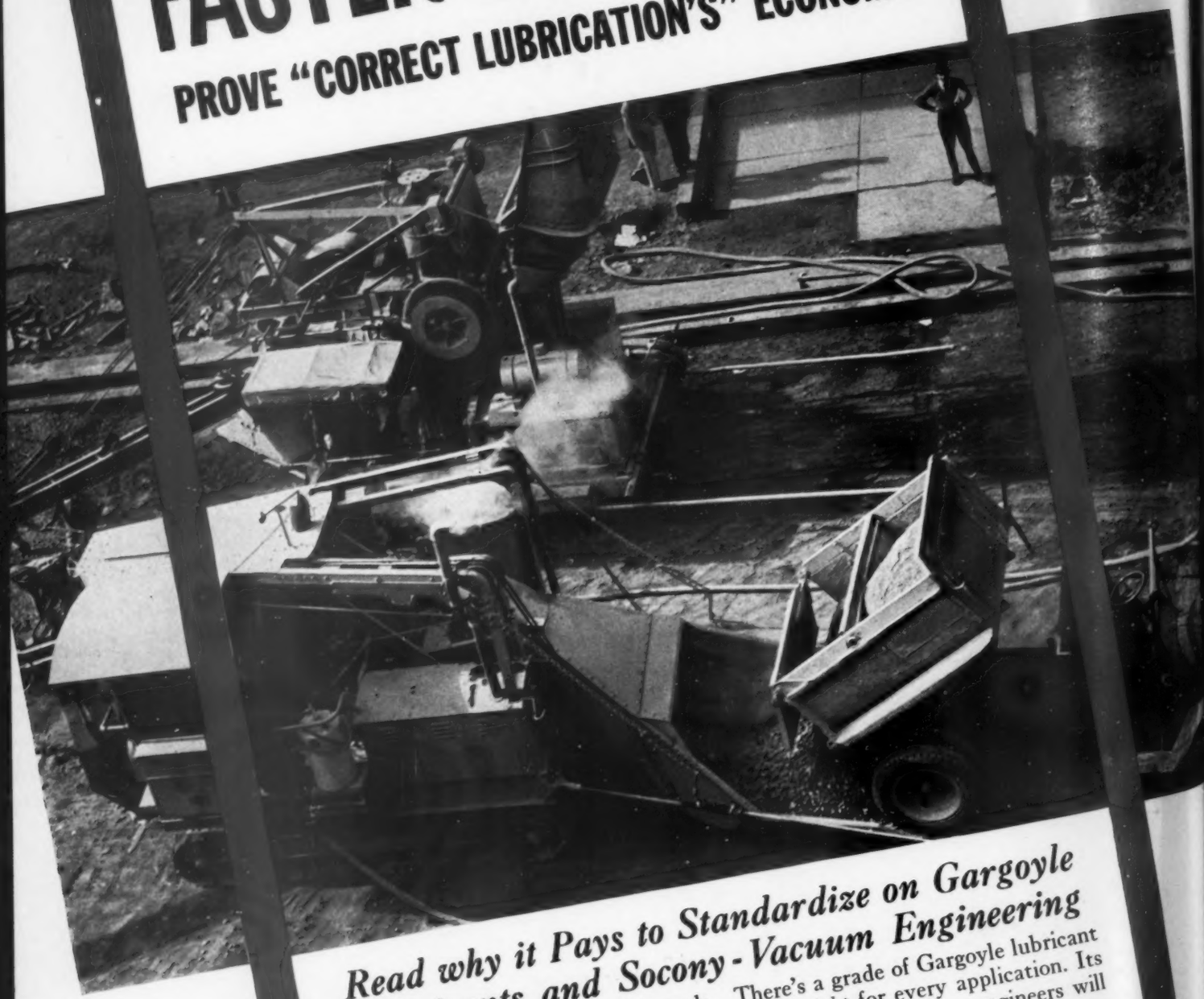
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN BITS


VOTE
TODAY!
SOCONY-VACUUM IS HELPING
THOUSANDS OF PLANTS ELECT ONE OR
MORE OF THESE FOUR CANDIDATES
Reduced power consumption
More continuous production
Decreased maintenance
Lower lubrication costs
LOOK AT THE NEXT PAGE

FASTER SCHEDULES

PROVE "CORRECT LUBRICATION'S" ECONOMY



Read why it Pays to Standardize on Gargoyle Lubricants and Socony-Vacuum Engineering

YOU HAVEN'T GOT a factory to work in — you have a tough job to do. Time makes the profits and the penalties. Time is controlled by machine efficiency . . . which is influenced by the oil you use for each type of unit.

There's a grade of Gargoyle lubricant that's *right* for every application. Its quality is proved. Our engineers will help your men . . . direct them to economies and efficiencies thousands of other contractors find profitable.

GARGOYLE

Lubricants

SOCONY-VACUUM OIL CO.

INCORPORATED

STANDARD OIL OF NEW YORK DIVISION · WHITE STAR DIVISION · LUBRITE DIVISION · WHITE EAGLE DIVISION
WADHAMS OIL COMPANY · MAGNOLIA PETROLEUM COMPANY · GENERAL PETROLEUM CORPORATION OF CALIFORNIA

AMERICAN TIGER BRAND IS USED TO *rough going*

AMERICAN TIGER BRAND WIRE ROPE

WHEREVER the going is tough —and the need for exceptional dependability exists — American Tiger Brand Wire Rope will establish remarkable records for its users.

This wire rope has proved its worth in keeping equipment in operation, in doing away with costly replacements and in lowering operating costs. Experience has proved its superiority. Always specify American Tiger Brand Wire Rope. Convenient stocks and our nearby engineers are both at your immediate call.

American Tiger Brand Wire Rope
Aerial Tramways
Amerclad All-Rubber Cables
Electrical Wires and Cables
Tiger Wire Rope Clips
Tiger Wire Rope Slings

AMERICAN STEEL & WIRE COMPANY
208 South La Salle St., Chicago
Empire State Bldg., New York

US STEEL

COLUMBIA STEEL COMPANY
Russ Building, San Francisco
United States Steel Products Company, New York,
Export Distributors

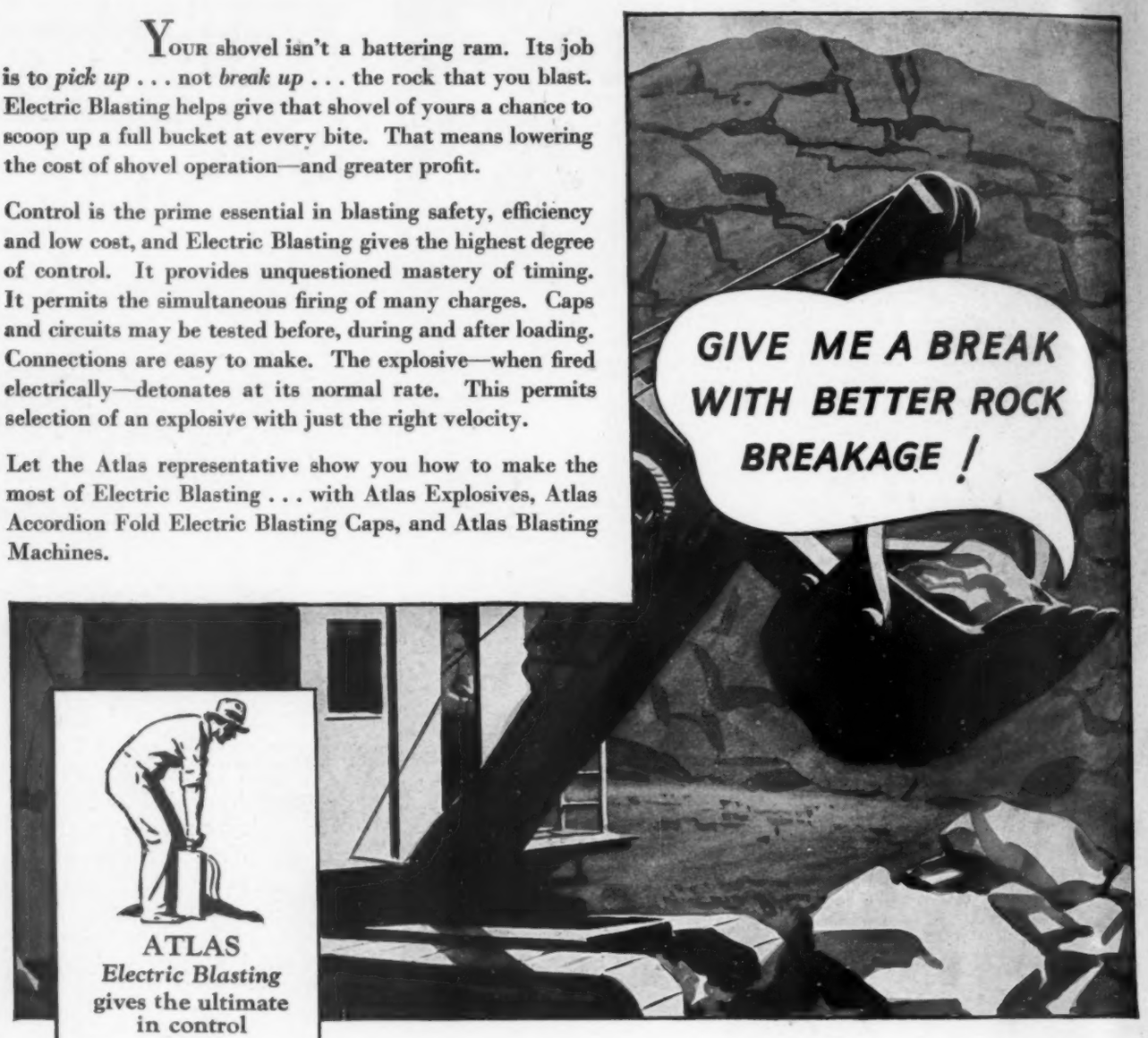
UNITED STATES STEEL

If your shovel could talk...

YOUR shovel isn't a battering ram. Its job is to *pick up* . . . not *break up* . . . the rock that you blast. Electric Blasting helps give that shovel of yours a chance to scoop up a full bucket at every bite. That means lowering the cost of shovel operation—and greater profit.

Control is the prime essential in blasting safety, efficiency and low cost, and Electric Blasting gives the highest degree of control. It provides unquestioned mastery of timing. It permits the simultaneous firing of many charges. Caps and circuits may be tested before, during and after loading. Connections are easy to make. The explosive—when fired electrically—detonates at its normal rate. This permits selection of an explosive with just the right velocity.

Let the Atlas representative show you how to make the most of Electric Blasting . . . with Atlas Explosives, Atlas Accordion Fold Electric Blasting Caps, and Atlas Blasting Machines.



ATLAS
Electric Blasting
gives the ultimate
in control

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

OFFICES

Allentown, Pa.	Joplin, Mo.	New Orleans, La.	Pittsburgh, Pa.	Spokane, Wash.
Boston, Mass.	Kansas City, Mo.	New York, N. Y.	Portland, Oregon	St. Louis, Mo.
Butte, Mont.	Knoxville, Tenn.	Philadelphia, Pa.	Salt Lake City, Utah	Tamaqua, Pa.
Denver, Colo.	Los Angeles, Calif.	Picher, Okla.	San Francisco, Calif.	Wilkes-Barre, Pa.
Houghton, Mich.	Memphis, Tenn.	Pittsburg, Kansas	Seattle, Wash.	

ATLAS
EXPLOSIVES

CHEMICALS ATLAS EXPLOSIVES

Announcing . . .

THE LORAIN ROLLED STEEL PLATE LINING

A new lining for ball, tube, and compartment tube mills that cuts initial cost — lengthens life — makes replacements easier, less expensive.

IN the present types of ball and tube mills for cement and metal grinding, the life of the cast liner is measured in terms of wear on the lifting bar. Once the risers are worn down enough to impair grinding, the *whole plate* must be discarded.

Now, for the first time, the Lorain Rolled Steel Plate Lining, capitalizing on the adaptability and lighter weight of rolled steel, makes available an improved lining plate with a self-wedged lifting bar that is reversible and renewable. Lifts or risers can be renewed without unnecessary scrapping of the body section. Thus, replacement costs are cut; grinding efficiency maintained.

Complete information on the Lorain Rolled Steel Plate Lining is available in a folder entitled "Ten Facts About The New Lorain Rolled Steel Plate Lining." This folder contains photographs, drawings and facts showing how this new construction can be profitable to you. The folder will be sent to you on request. Send now for your copy.

Carnegie-Illinois Steel Corporation,
Lorain Division,
Johnstown, Pennsylvania
Gentlemen:
Please send a copy of the folder entitled "Ten Facts About The New Lorain Rolled Steel Plate Lining."

Name.....

Address.....

CARNEGIE-ILLINOIS STEEL CORPORATION

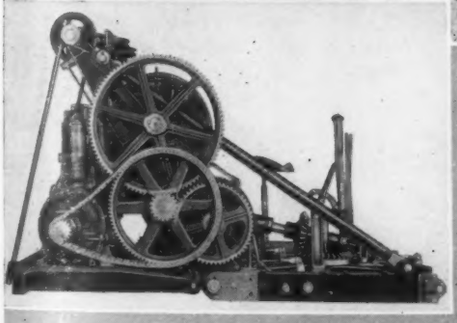
Lorain Division
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

Johnstown, Pa.
United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

¾ yd. LORAIN 40

THERE IS NO OTHER MACHINE LIKE IT ON THE MARKET



★ BECAUSE no other machine has the sloping machinery frame (patents applied for) which is the greatest single factor in enabling the Lorain-40 to handle a ¾ yd. dragline bucket or shovel dipper at a working weight and price approximating those of most ½ yd. machines . . . The new L-40 bulletin gives plenty of reasons why the Center Drive built L-40 is the fastest selling ¾ yd. machine in the world today. Write for it.

THE UNIVERSAL CRANE CO., LORAIN, OHIO

THEW CENTER DRIVE

LORAINS

MOVE MORE MATERIAL, FASTER AT LOWER COST

CU. 3/8 to 2 YD.

MEET STRICTER SPECIFICATIONS

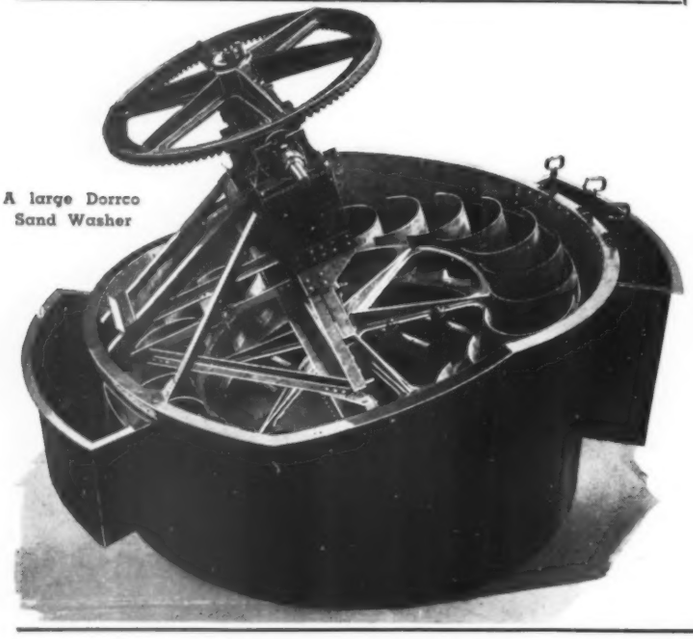
with a

DORRCO SAND WASHER...

Dorrco Sand Washer on trailer, ready to move to the next location

DORRCO SAND WASHER SIZES

Size	Capacity
7 ft. dia.	20- 40 tons per hr.
9 " "	40- 80 " " "
12 " "	80-150 " " "
16 " "	150-300 " " "



A large Dorrco Sand Washer

HERE is a compact, self-contained unit—The Dorrco Sand Washer—that will settle once and for all that matter of stricter sand specifications. It is ideally adapted to installation on dredges, on land or on portable sand plants. It is built by the same company that supplied the special sand washing systems for the world's two largest preparation plants at Boulder and Grand Coulee Dams.

Fine grain is recovered and not lost in the silt-laden overflow water. Sand is washed mechanically by the revolving buckets and is discharged after draining without loss in head.

The Dorrco Sand Washer is supplied in four convenient sizes as listed at the left. The two smaller sizes are shipped completely assembled, ready for installation on a simple timber foundation.

DORRCO

Write Now For Our Booklet

"ARE YOU GETTING CLEAN SAND"

THE DORR COMPANY INC.

ENGINEERS • 570 Lexington Ave., New York

CHICAGO • TORONTO • DENVER • LOS ANGELES • ATLANTA

DORR TECHNICAL SERVICES AND EQUIPMENT ARE AVAILABLE FROM THE FOLLOWING COMPANIES:

HOLLAND: Dorr-Oliver N. V. The Hague
FRANCE: Soc. Dorr-Oliver, Paris
GERMANY: Dorr Gesellschaft, m. b. H. Berlin
ENGLAND: Dorr-Oliver Company Ltd., London
AUSTRALIA: Crossle & Duffy Pty. Ltd., Melbourne
SOUTH AFRICA: Edward L. Bateman Pty. Ltd., Johannesburg
JAPAN: Andrews & George Co. Inc., Tokio
ARGENTINA: Luis Fiore, Buenos Aires
BRAZIL: Oscar Taves & Co., Rio de Janeiro

Roebling...

The pacemaker in wire rope development

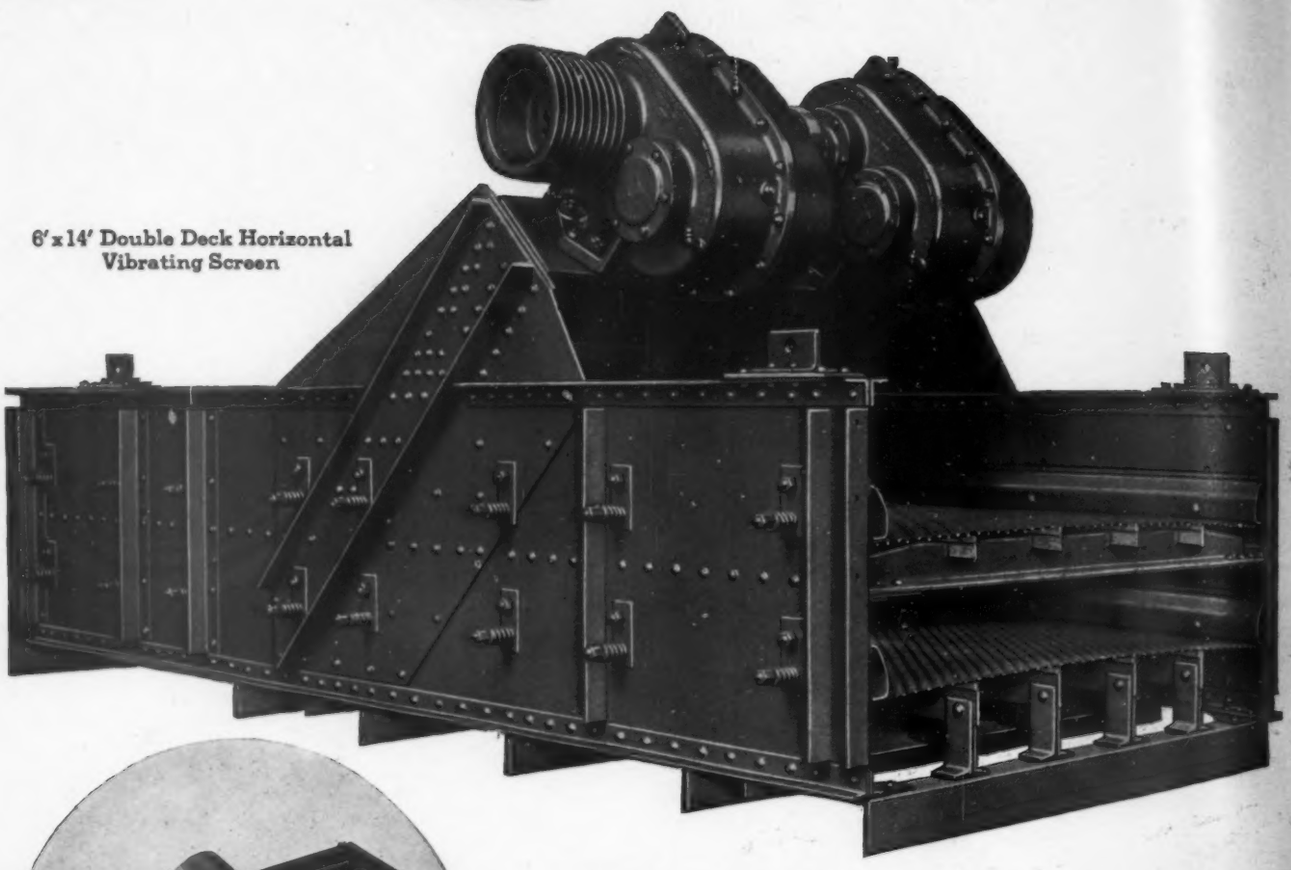
THE most exacting basis for judging wire rope performance is AVERAGE SERVICE.

This is the basis advocated by Roebling, in which rope cost per ton of material handled, or per other unit of service measurement, is based not on the service of a single rope but on the *average* service of several ropes.

John A. Roebling's Sons Co.,
Trenton New Jersey

TRADE MARK
JAR
REG. U.S. PAT. OFF.

Low Headroom - Large Tonnages



6′x14′ Double Deck Horizontal Vibrating Screen

1′x2′6″ Horizontal Screen

THE NEW Allis-Chalmers Low-Head vibrating screen is filling a definite need in many plants. Its minimum space requirements enable it to be installed in places that would accommodate no other type of screen. Very little change in plant layout is needed.

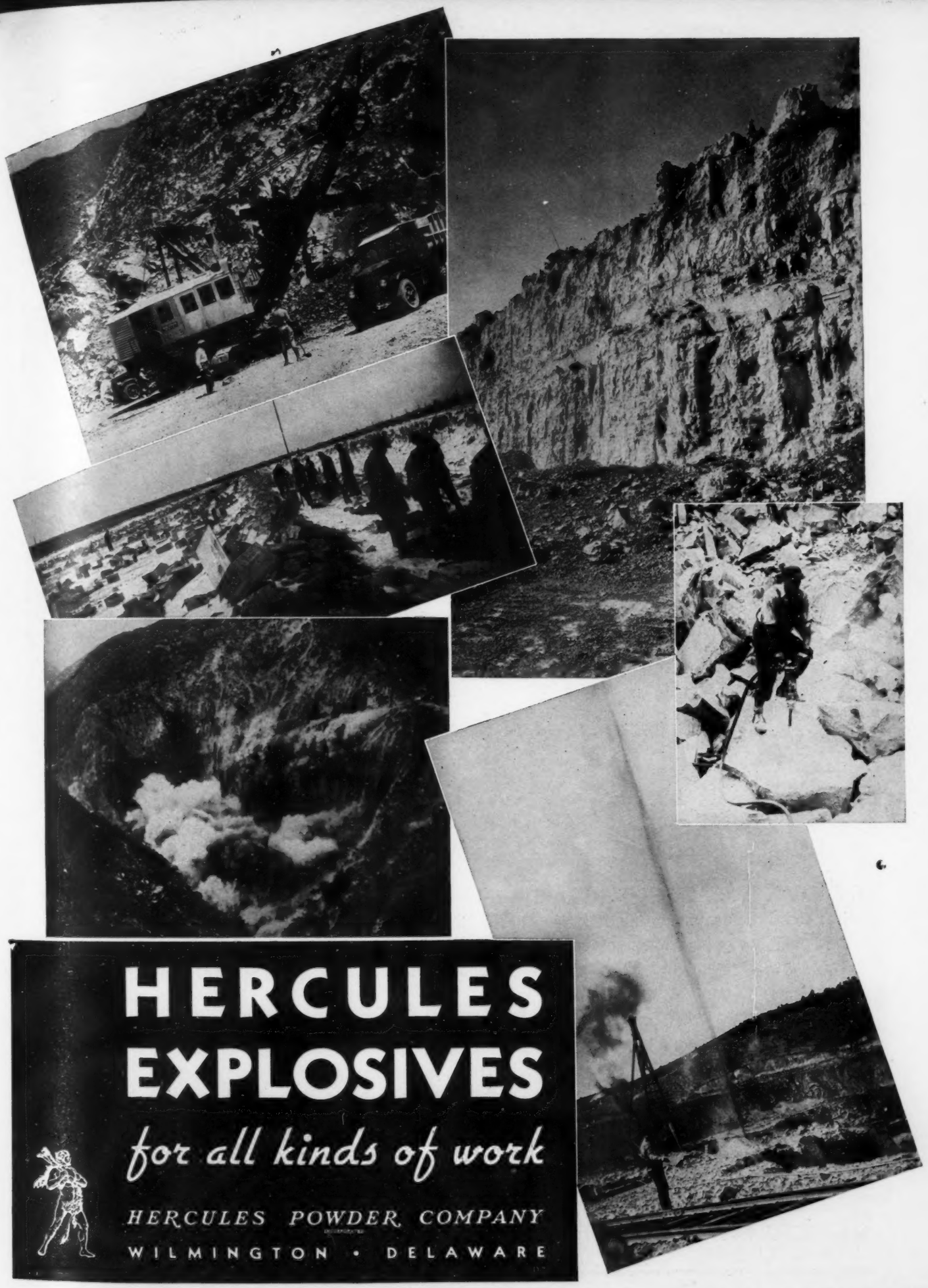
Not only are Low-Head screens easy to install but they handle large tonnages with high screening efficiency and low power consumption. They are built in sizes ranging from 3′x6′ to 6′x14′, single, double or triple decks.

Write for Bulletin 1478.

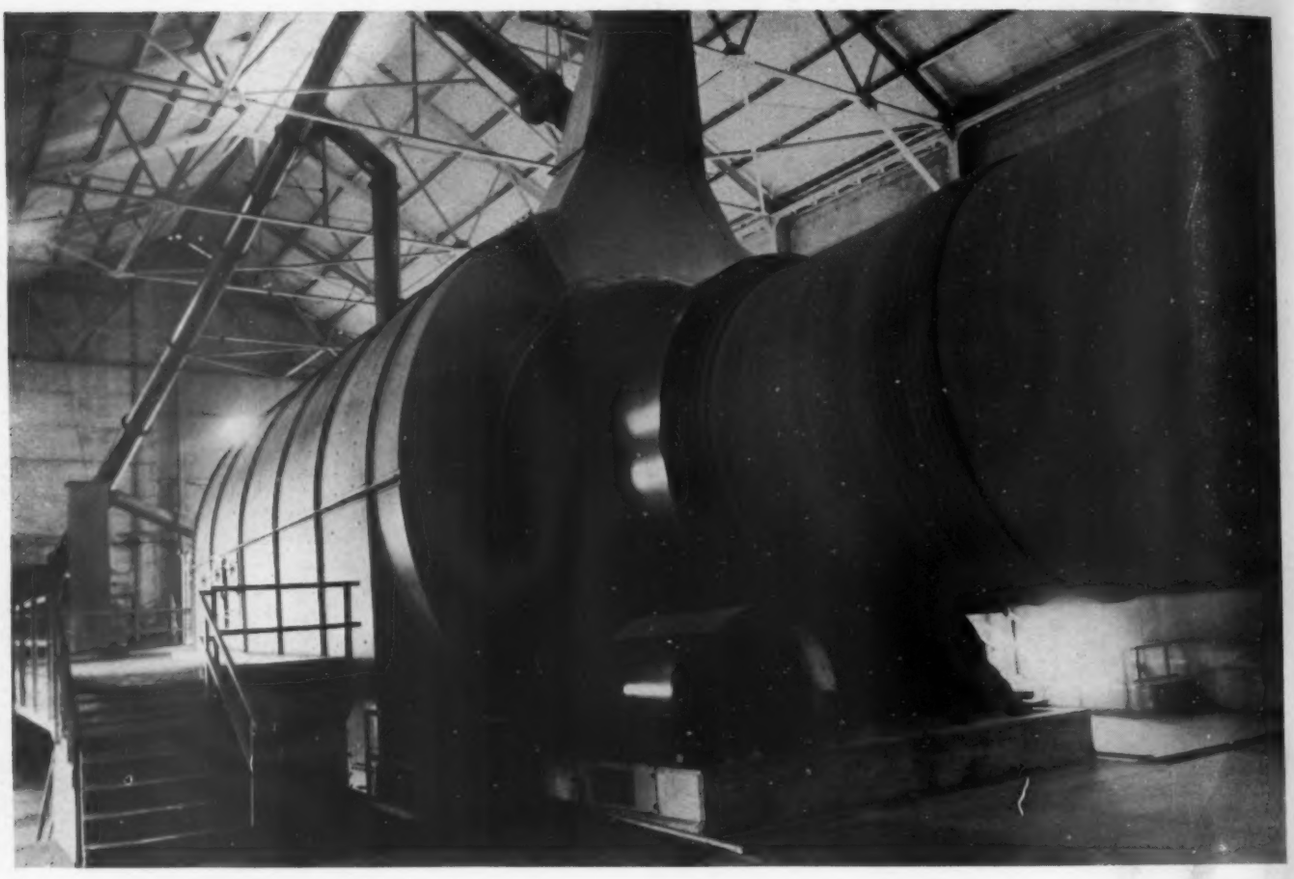
CRUSHING AND CEMENT DIVISION

ALLIS·CHALMERS

MILWAUKEE WISCONSIN


HERCULES
EXPLOSIVES
for all kinds of work
HERCULES POWDER COMPANY
WILMINGTON • DELAWARE

UNAX GRATE COOLER
FOR ROTARY KILNS
AIR QUENCHING TYPE INTEGRAL WITH KILN



THE UNAX GRATE COOLER consists of two parts: one stationary, one revolving. The stationary part comprises a casing surrounding the outlet end of the kiln and containing a stationary grate. The revolving part consists mainly of conveying flights and scoops attached to and rotating with the kiln, spreading the clinker evenly over the grate, through which cooling air is passed. The heated air is used for combustion in the kiln.

ADVANTAGES

Rapid, efficient cooling of product. Increase in fuel economy of the kiln. Increase in grindability of clinker. Improvement in quality of the cement. Low first cost, low maintenance cost.

The longest kilns in the world (512′ and 520′) are equipped with these Unax Grate Coolers.

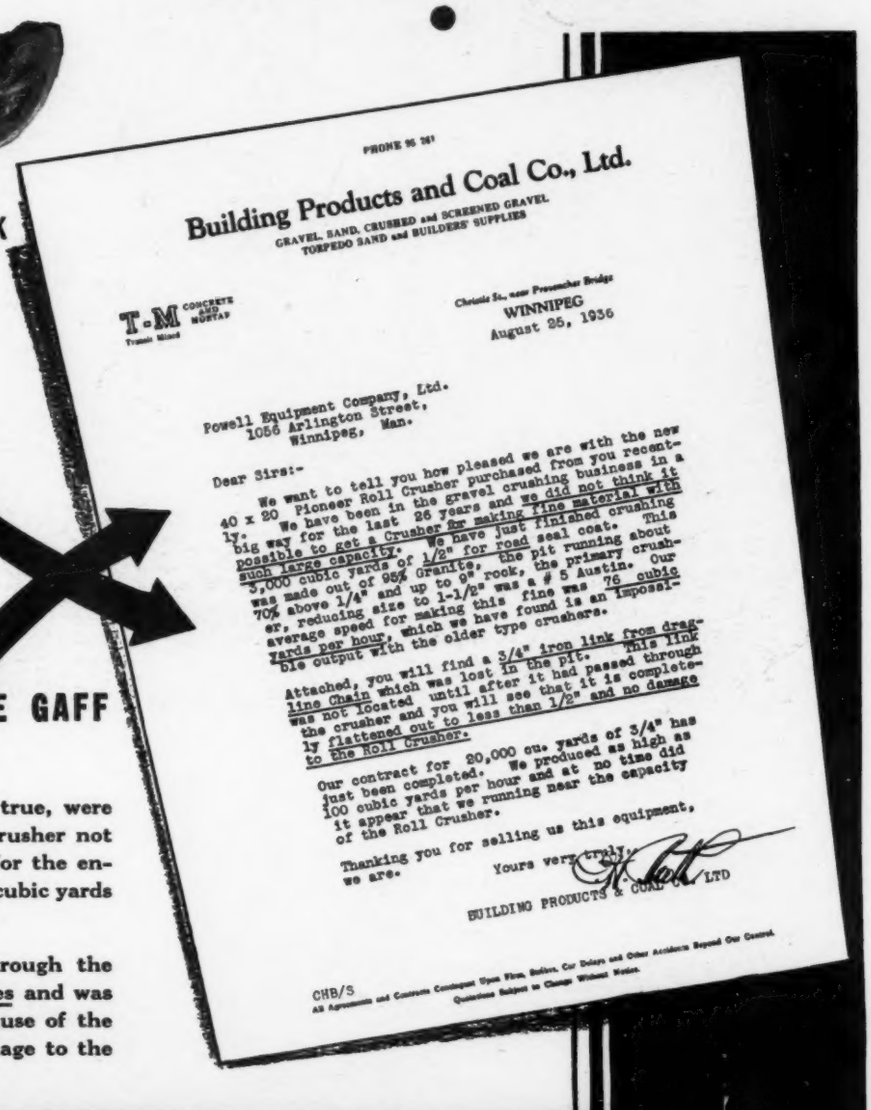
F. L. SMIDTH & CO.

225 BROADWAY — **Engineer Specialists in Designing and Equipping Cement Making Factories** — NEW YORK, N. Y.

76 CUBIC YARDS and the "MISSING LINK" CRUSHED IN ONE HOUR!

READ MR. BOOTH'S SENSATIONAL STORY

THE MISSING LINK



PHONE 96 761

Building Products and Coal Co., Ltd.

GRAVEL, SAND, CRUSHED and SCREENED GRAVEL
TORPEDO SAND and BUILDERS' SUPPLIES

T-M CONCRETE AND MORTAR
Transit Mixed

Christie St., near Provencher Bridge
WINNIPEG
August 25, 1936

Powell Equipment Company, Ltd.
1056 Arlington Street,
Winnipeg, Man.

Dear Sirs:-

We want to tell you how pleased we are with the new 40 x 20 Pioneer Roll Crusher purchased from you recently. We have been in the gravel crushing business in a big way for the last 26 years and we did not think it possible to get a Crusher for making fine material with such large capacity. We have just finished crushing 3,000 cubic yards of 95% Granite, for road seal coat. This was made out of the pit running about 70% above 1/4" and up to 9" rock, the primary crusher, reducing size to 1-1/2" was a # 5 Austin. Our average speed for making this fine was 76 cubic yards per hour, which we have found is an impossible output with the older type crushers.

Attached, you will find a 3/4" iron link from dragline Chain which was lost in the pit. This link was not located until after it had passed through the crusher and you will see that it is completely flattened out to less than 1/2" and no damage to the Roll Crusher.

Our contract for 20,000 cu. yards of 3/4" has just been completed. We produced as high as 100 cubic yards per hour and at no time did it appear that we running near the capacity of the Roll Crusher.

Thanking you for selling us this equipment, we are.

Yours very truly,

BUILDING PRODUCTS & COAL CO. LTD

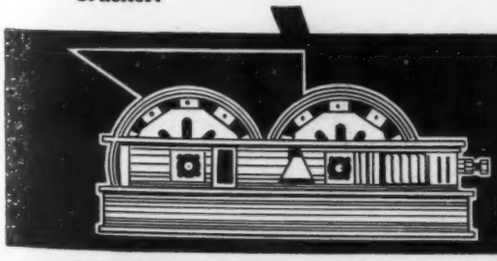
CHB/S

All Agreements and Contracts Contingent Upon Fire, Strikes, Car Delays and Other Accidents Beyond Our Control.
Quotations Subject to Change Without Notice.

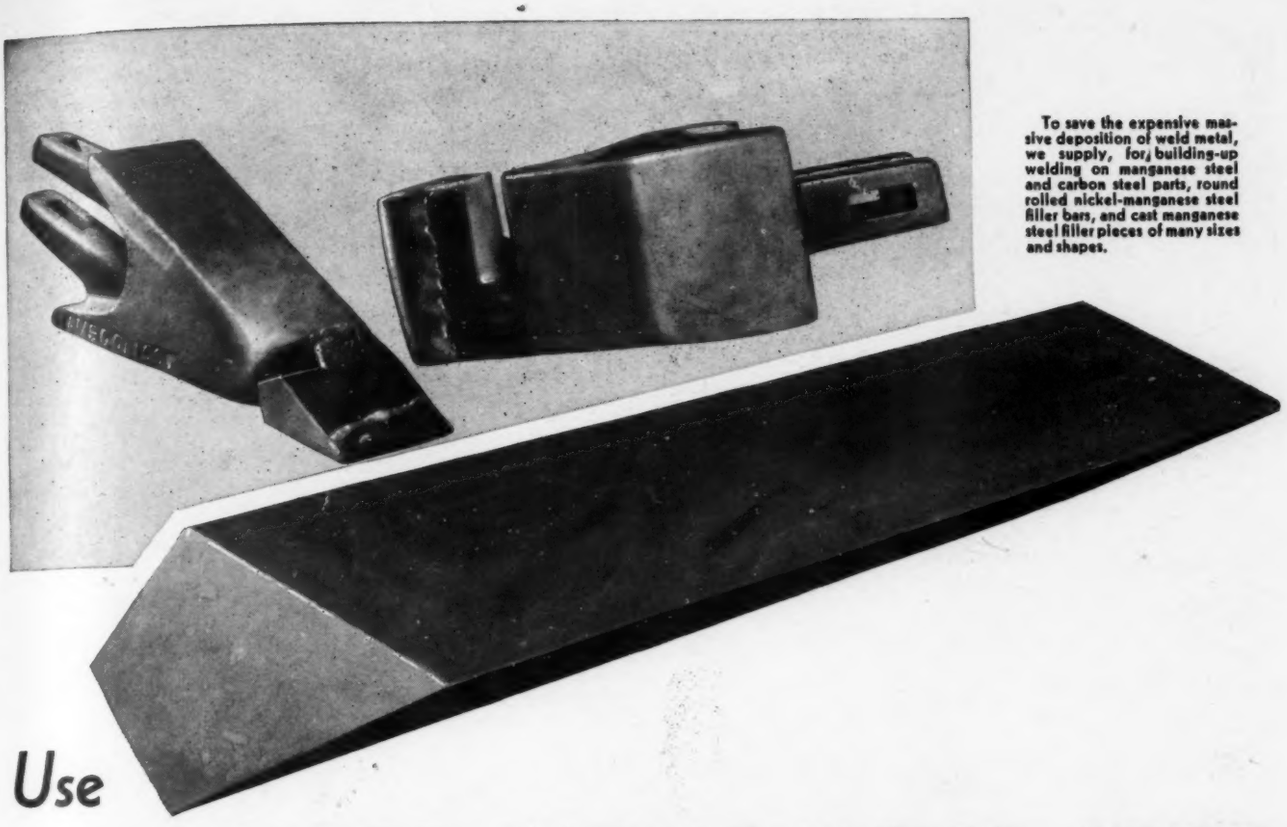
BUILT TO STAND THE GAFF

These results, astonishing but true, were obtained with a Pioneer Roll Crusher not for one hour nor one day—but for the entire job, this Crusher ageraged 76 cubic yards per hour of ½" minus.

The "Missing Link" went through the Crusher not once but many times and was reduced to exactly ½" . . . because of the spring release there was no damage to the Crusher.



PIONEER GRAVEL EQUIPMENT MFG. CO.
1515 CENTRAL AVE. MINNEAPOLIS MINN



To save the expensive massive deposition of weld metal, we supply, for building-up welding on manganese steel and carbon steel parts, round rolled nickel-manganese steel filler bars, and cast manganese steel filler pieces of many sizes and shapes.

Use

AMSCO MANGANESE STEEL REPOINTER BARS FOR SALVAGING DIPPER TEETH

Here are two Manganese Steel Dipper Teeth partly welded to show the method of applying an AMSCO Manganese Steel Repointer. These diamond section bars are made in all logical sizes. They are cut off to the width of the dipper tooth, and then welded into position with AMSCO Nickel-Manganese Steel Welding Rod. Where needed, the repointer can be hard faced with AMSCO No. 459 Hard Facing Welding Rod.

AMSCO Manganese Steel Dipper Tooth Repointer Bars provide a *quick, simple, low cost* method of rebuilding dipper teeth, and are available from stock in many sizes and lengths.

Other AMSCO salvage welding items include cast manganese steel filler pieces and round rolled bars of Nickel-Manganese Steel for building up crusher jaw plates, crusher mantles, pulverizer hammers, etc.

Use AMSCO Manganese Steel Castings and AMSCO Nickel-Manganese Steel Welding Rod for best results in building up worn Manganese Steel or carbon steel equipment parts.

AMSCO HARD-FACING WELDING RODS

AMSCO No. 459 and No. 217 Welding Rods are very economical for hard-surfacing all ferrous metal parts not subjected to extreme temperatures. They apply easily by either arc or gas, and are equal in wear resistance to rods costing much more.

AMERICAN MANGANESE STEEL COMPANY

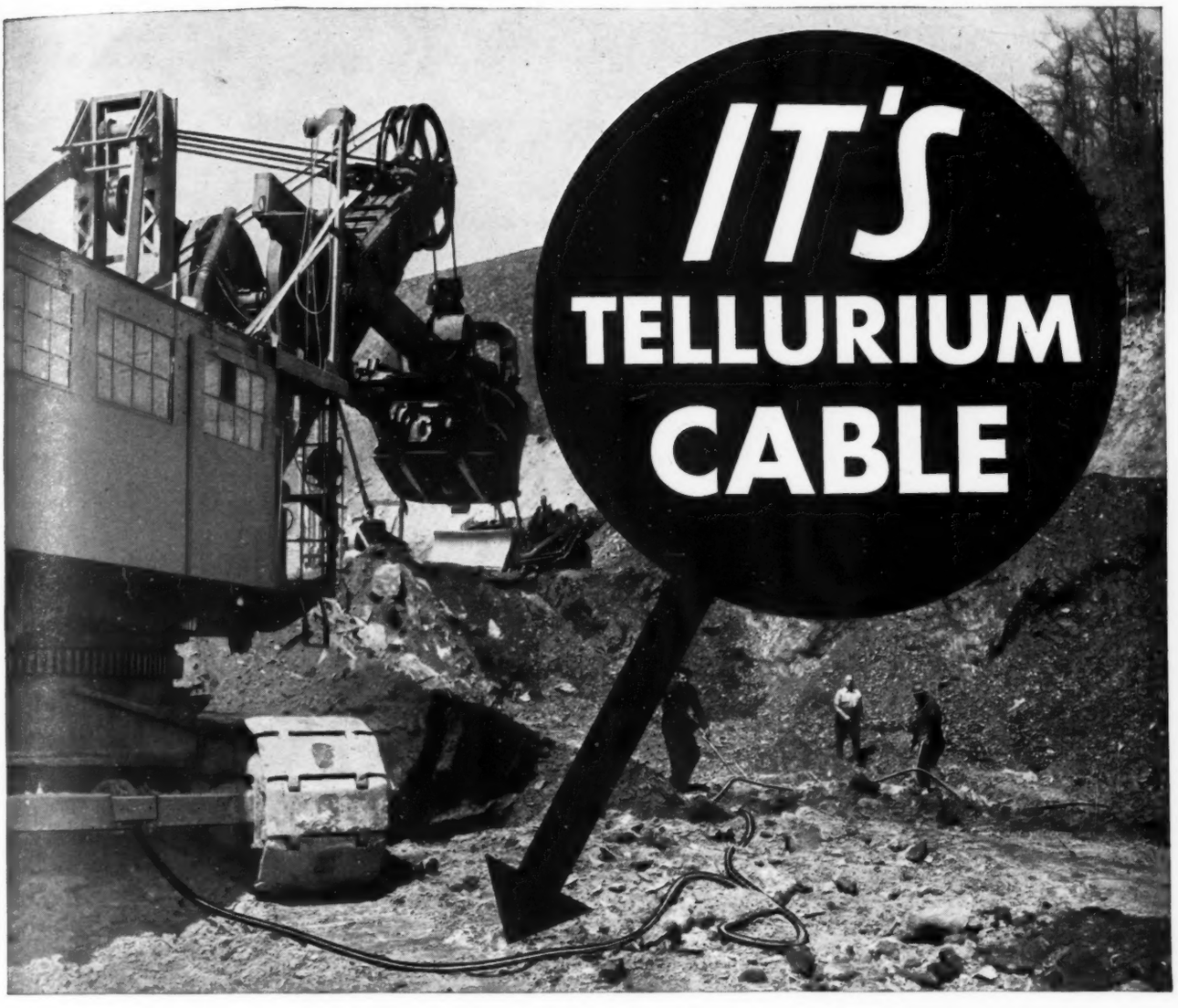
Division of American Brake Shoe & Foundry Company

377 East 14th Street, Chicago Heights, Ill.

Foundries at Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.; Los Angeles, Calif. • Offices in Principal Cities

AMSCO

TRADE MARK REGISTERED



and This Contractor Says . . . "IT'S ALL RIGHT"

THE president of this company*, a large coal-stripping contractor, personally supplied the information about the G-E tellurium-rubber portable cable on his electric shovels.

"Why, yes, it's all right," he said. "Of course, the cable is used under very rough conditions—sharp coal, falling rocks, and what not. Then, I'm afraid the men don't watch it too carefully, and trucks run over it. But, despite everything, that 500-foot piece on the Bucyrus-Erie 120-B is in excellent shape."

The cable referred to, and shown in the picture, is a 5000-volt Type G (three-conductor with ground wires) tellurium-compounded all-rubber cable. The shovel, which has a capacity of 4 cubic yards, is coal-stripping in eastern Pennsylvania.

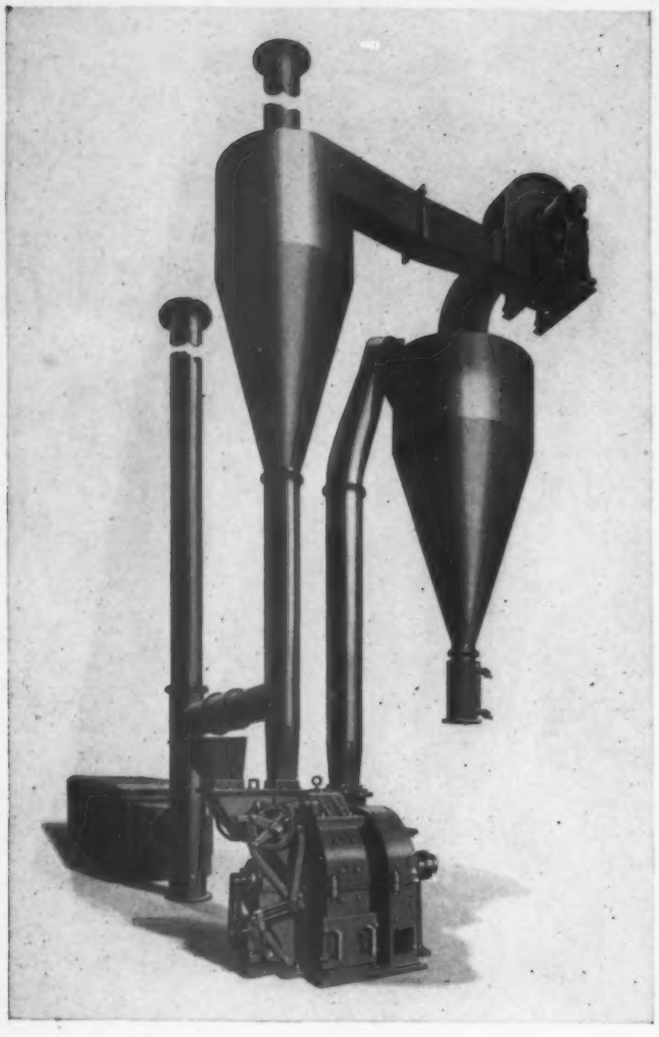
*Name on request

Give Tellurium a Trial

Naturally, you can expect to get just as good results with G-E tellurium-rubber cable as has this contractor. Try it. The next time you need cable for replacement on your electric shovels, cutters, loaders, or locomotives, call on your G-E jobber. He can supply all types and sizes promptly. For prices and specifications, see Bulletins GEA-1728 and GEA-1918. Address nearest G-E jobber, G-E sales office, or General Electric, Dept. 6C-201, Schenectady, N. Y.

520-81

GENERAL ELECTRIC



Raymond Imp Kiln Mill for operating with the Flash Drying System in pulverizing and drying operations

Speed up your process with

FLASH DRYING

TEN SECONDS for the product to pass through the mill . . . removing moisture and reducing the material in one, continuous operation . . . that's typical performance under average conditions.

The Raymond method confines the entire process in an enclosed, dust-tight system that is completely automatic from feed hopper to finish bin. Flash Drying combines advantages of

Lower capital investment than ordinary rotary drying equipment
Close control over the product in dryness and fineness
Economical operation and maintenance

The Imp Kiln Mill is widely and successfully used for handling gypsum, clay materials, chemicals, filter-press products and many other high moisture materials. Write for detailed information.

RAYMOND

BROS. IMPACT PULVERIZER CO.

Division of Combustion Engineering Company, Inc.

1307 North Branch Street CHICAGO, ILL.

Sales Offices in Principal Cities

Canadian Representatives:
Combustion Engineering Corporation, Ltd., Montreal

Rock Products

WITH WHICH IS INCORPORATED CEMENT and ENGINEERING NEWS FOUNDED 1896 . . .

Volume XXXIX | Chicago, October, 1936 | Number 10

Perhaps There Are Some Good Features in the Robinson-Patman Act

THE Robinson-Patman Act "to supplement existing laws against unlawful restraints and monopolies, and for other purposes", now in effect, has aready caused the use of so much paper and printers' ink that any conscientious editor hesitates to discuss it for fear of adding to the general confusion.

However, most of this confusion has been contributed by lawyers and legally-minded commentators, possibly with the end in view of impressing listeners and readers with the necessity of employing legal talent later on. Most assuredly such talent will be needed when cases are brought before the Federal Trade Commission and the courts. Prior to that time, it seems to us, business men should attempt to acquire a philosophical viewpoint rather than a legal one.

Of the few such philosophical discussions and by far the best is one that has been made by two economists, Willard L. Thorp and Edwin B. George, for Dun & Bradstreet, Inc. They give it the title "Check List of Possible Effects of the Robinson-Patman Act." A careful reading of this will show that the act really has some constructive features; and, since the law is an actual accomplishment, the purpose of business and industry should be to find these elusive but constructive elements and develop them, rather than to condemn the act as a whole without attempting to understand it.

For example, it is suggested that the law *may* provide a new incentive toward development of trade standards to forestall the ready and petty complaints of customers who would be continually seeing or imagining that they saw a cause for complaint in different price treatment of commodities which to them were exactly alike. This would tend to put market emphasis on price; and to whatever extent prevailing confusion in the price field is relieved, selling effort would have to shift to quality to overcome it—not a bad tendency.

Price structures in general are likely to be greatly simplified because of the futility of old methods of glossing discriminatory treatment of customers by expressing it indirectly, as through individual price concessions or special allowances and services. Hence the tendency toward a one-price policy may be much strengthened.

Inconsistency in delivery policies is common, and their very looseness could be made to support systematic price discriminations. Standards of right and wrong use of this function would have to emerge, even though the law should be construed not directly to control delivery policies. This would perhaps involve some common understanding as to how much freight cost absorption is justifiable in delivered prices. (There is considerable difference of opinion as to whether the law as relating to prices means factory or delivered prices.) Terms of sale also are so intimately associated with pricing policies that some kind of standardization of these must result.

The law will tend to make it necessary for producers or sellers to know the current market conditions more accurately. A good market record kept by the seller may be his best defense against charges of unlawful price discrimination. That means more intelligent management of sales, which should be helpful all around.

There may be a tendency to reduce the number of changes in discounts, once they are carefully established, and to place the main burden of price adjustment to market conditions on the list price. The extreme form of discount adjustment was the "creeping price change", customer by customer. Such individual pricing is now peculiarly eligible for dismissal as discriminatory. Any strict interpretation of the law as prohibiting local price-cutting "for the purpose of destroying a competitor or eliminating competition" would give tremendous impetus to the limitation of sales to those which could be made at a single price, or with few quantity variations.

Indications are that because of this law manufacturers will incline toward giving greater publicity to their prices.

Dates to Remember

KEEP these important dates in mind:

***CONVENTION** of the National Sand and Gravel Association at Peabody Hotel, Memphis, Tenn., December 7, 8, 9 and 10, 1936. All producers in the industry are invited, whether members of the association or not. The program will include an open forum for frank discussion of all subjects affecting the welfare of the industry.*

• • •

***CONVENTION** of the National Ready Mixed Concrete Association at Peabody Hotel, Memphis, Tenn., December 11 and 12.*

• • •

***CONVENTION** of the American Road Builders' Association and American Road Congress at New Orleans, La., January 11-15, incl., 1937.*

• • •

***CONVENTION** of the National Crushed Stone Association, Netherlands Hotel, Cincinnati, Ohio, January 18, 19 and 20, 1937. All crushed stone producers, whether members of the association or not, are invited.*

either individually or centralized, industry-wide filing of either past or present prices. Such publicity will be a defense against charges of price discrimination and will be taken as evidence of good faith, thus reducing the threat of investigation. In some cases prices may be published as an assistance in resisting purchasers' demands for inside concessions. The qualified permission to adjust prices to meet competition, and to change prices in accordance with changing market conditions, places a premium on industry-wide knowledge of individual prices.

When and where price differentials are used, accounting methods will have to be thoroughly overhauled in order to permit more precise cost calculations on individual products, quantities, services, sales and profit returns from particular sales, etc. This will encourage the use of single price policies, or the use of a high degree of judgment and intelligence in selling practices. Some have already started time studies (1) to put their pricing practices completely within the law; (2) because they believe such records will, in the long run, prove the cheapest form of defense, even though they may have to disclose their costs to competitors in case of an investigation.

From this outline it can be readily seen that there is a greater opportunity than ever for leadership by trade and industrial associations. There should be a marked increase in their activity and an increase in their membership. They must in the long run serve most usefully in developing "open-door" conditions which will contribute to effective operation—uniform cost accounting, market analysis not only in the broad sense but in the narrower problems of trading areas and competitive relationships, product standardization, price publicity and the like.

The foregoing paragraphs are composed very much of excerpts from the report first referred to. There is no originality pretended for them. The authors themselves say their report is merely a digest of a very great volume of current literature. We have merely picked out some parts that tend to show that the law really does have constructive features along the lines of fair trade practice rules, as developed by industry itself in the various NRA codes.

Just how an industry may profit from the law is possibly indicated by the action of the fertilizer industry in seeking new trade practice rules which take this new law into account. The fertilizer industry has many of the characteristics of the various branches of the rock products industry. It was one of the first to take advantage of the NIRA and organize a code authority, which was successful in checking a very serious price war, with the result that the industry enjoyed a brief period of comparative prosperity. Not long after the abandonment of its code another price war followed, and conditions are still far from satisfactory. So no stone has been left unturned by an aggressive trade association to take advantage of any straw that pointed to a possible way out.

New Code of Trade Practices

The industry's proposed new Federal Trade Commission rules for fair trade practices include the following under group 1 (actual violations of existing laws):

Rule 4.

(a) *Prohibited Discriminatory Differentials, Rebates, Refunds, Discounts, Credits and Other Allowances.* It is an unfair trade practice for any member of the industry engaged in commerce, in the course of such commerce, to grant or allow, secretly or openly, directly or indirectly, any price differentials, rebates, refunds, discounts, credits or other allowances which effectuate a discrimination in price between different purchasers of goods of like grade and quality where either or any of the purchases involved therein are in commerce and where the effect thereof may be substantially to lessen competition or tend to create a monopoly in any line of commerce or to injure, destroy or prevent competition with any person who either grants or knowingly receives the benefit of such discrimination or with customers of either of them: *Provided, however*—

(1) That the goods involved in any such transaction are sold for use, consumption or resale within any place under the jurisdiction of the United States;

(2) That nothing herein contained shall prevent differentials which make only due allowance for differences in the cost of manufacture, sale or delivery resulting from the differing methods or quantities in which such commodities are to such purchasers sold or delivered;

(3) That nothing herein contained shall prevent persons engaged in selling goods, wares or merchandise in commerce from selecting their own customers in bona fide transactions and not in restraint of trade;

(4) That nothing herein contained shall prevent price changes from time to time where made in response to changing conditions affecting either (a) the market for the goods concerned, or (b) the marketability of the goods, such as, but not limited to, actual or imminent deterioration of perishable goods, obsolescence of seasonal goods, distress sales under court process, or sales in good faith in discontinuance of business in the goods concerned.

(b) *Prohibited Brokerages and Commissions.* It is an unfair trade practice for any member of the industry engaged in commerce, in the course of such commerce, to pay or grant, or to receive or accept, anything of value as a commission, brokerage, or other compensation, or any allowance or discount in lieu thereof, except for services rendered in connection with the sale or purchase of goods, wares, or merchandise, either to the other party to such transaction or to an agent, representative, or other intermediary therein where such intermediary is acting in fact for or in behalf, or is subject to the direct or indirect control, of any party to such transaction other than the person by whom such compensation is so granted or paid.

(c) *Prohibited Advertising or Promotional Allowances, Etc.* It is an unfair trade practice for any member of the industry engaged in commerce, to pay or contract for the payment of advertising or promotion allowances or any other thing of value to or for the benefit of a customer of such member in the course of such commerce as compensation or in consideration for any services or facilities furnished by or through such customer in connection with the processing, handling, sale, or offering for sale of any products or commodities manufactured, sold, or offered for sale by such member, unless such payment or consideration is available on proportionally equal terms to all other customers competing in the distribution of such products or commodities.

(d) *Prohibited Discriminatory Services or Facilities.* It is an unfair trade practice for any member of the industry engaged in commerce to discriminate in favor of one purchaser against another purchaser or purchasers of a commodity bought for resale, with or without processing, by contracting to furnish or by furnishing, or by contributing to the furnishing of, any services or facilities connected with the processing, handling, sale, or offering for sale of such commodity so purchased upon terms not accorded to all purchasers on proportionally equal terms.

(e) *Illegal Price Discrimination.* It is an unfair trade practice for any member of the industry or other person engaged in commerce*, in the course of such commerce to discriminate in price in any other respect contrary to Section 2 of the Clayton Act as amended by the Act of Congress, approved June 16, 1936, (Public No. 692, 74th Congress), or knowingly to induce or receive a discrimination in price which is prohibited by such section as amended.

In the Group II rules (those whose enforcement at law is doubtful) is the following:

Rule B—Information and Statistics.

For the purpose of promoting and fostering free and fair competition to the end that the purchasing and consuming public and industry may enjoy the fruits and benefits of such competition, the Fertilizer Industry approves of each member thereof voluntarily, through an agency designated by them, disseminating to the trade and the purchasing public, so far as proper under the law, such statistical information regard-

* As herein used, the word "commerce" means trade or commerce among the several States and with foreign nations, or between the District of Columbia or any Territory of the United States and any State, Territory, or foreign nation, or between any insular possessions or other places under the jurisdiction of the United States, or between any such possession or place and any State or Territory of the United States or the District of Columbia or any foreign nation, or within the District of Columbia or any Territory or any insular possession or other place under the jurisdiction of the United States; Provided, That this shall not apply to the Philippine Islands.

ing past and completed transactions relating to production, sales and distribution of the products of the industry as is pertinent to the intelligent operation of the respective business of each member in carrying out said purpose: Provided, however, no coercive action shall be taken individually or collectively, nor any arrangement, understanding, agreement or collusion entered into or effectuated, directly or indirectly, to fix, maintain or enhance prices, or to adhere to any price or prices charged or to be charged, or to curtail production or to otherwise unlawfully suppress competition or unlawfully restrain trade, and provided further it shall be understood that each member of the industry shall be free at all times to change his prices or terms of sale.

It is the plain obligation of business management to make the most of legitimate opportunities to profit. There are other kinds of profit than that measured in dollars. One such way to profit is to be alert in adjusting one's business to actualities. Those who pin their fate on turning the tide of popular trends may be about as successful as the old lady with her broom against the tide.

U.S.A. To Make Cement

UNITED STATES DEPARTMENT OF THE INTERIOR, under Secretary Ickes' insistence and the President's approval, is not to be deterred from spending $850,000 of WPA money for construction of a cement plant in Puerto Rico, according to Hearst press reports.

This plant is to be owned and operated in a similar manner to the rum industry in the Virgin Islands, where a million-dollar government plant was put into operation about two years ago.

Bids were to have been opened several weeks ago, but the opening was postponed because machinery manufacturers reported they had no opportunity to make necessary studies of the specifications, and thus could not prepare price estimates.

It is said that when the cement plant project was first proposed, Secretary of Commerce Roper made an adverse report on it from an economic as well as practical standpoint. The project has been criticized widely as "a highly speculative venture in state socialized enterprise."

Among the most vigorous criticisms has been the fact that private capital was willing to go into Puerto Rico to establish a cement mill but was told that Secretary of the Interior Ickes was "strongly in favor of government ownership and would take a very critical view of any offers by private industry to establish commercial mills there."

The Department of the Interior insists the plant is necessary, in order to provide cheap cement for roads and home-building in the island. Concrete buildings are necessary, the department holds, because frame buildings are easily destroyed by hurricanes.

Critics of the venture point out the Public Works Administration boasts of having created 98,500,000 man hours of employment in the cement industry by public works projects, and yet paradoxically establishes a plant to compete with the industry.

To Eliminate Holding Company

INTERNATIONAL CEMENT CORP., New York City, which is a holding company for a number of wholly-owned subsidiary "Lone Star" cement companies, has called a special meeting of stockholders for October 15 to get approval for a plan to merge these subsidiaries with the parent company under the name Lone Star Cement Corp.

"Because of the recent changes which have been made in the Federal revenue laws," Charles L. Hogan, president, said, "it has been deemed desirable by the directors to liquidate the various domestic subsidiaries and to transfer their assets to this corporation.

"The products of the domestic subsidiaries have for many years been marketed under the trade name Lone Star, and it is considered advisable that the name of the corporation be accordingly changed to Lone Star Cement Corp. The proposed change is recommended by the board of directors."

Mexican Purchase

LA CRUZ AZUL, S.C.L., CO-OPERATIVA MANUFACTURERA DE CEMENTO PORTLAND, Jasso, Hidalgo, Mex., recently purchased Bradley Hercules mills for preliminary clinker grinding.

State Plant Opens

NORTH CAROLINA state-owned and state-operated quarry and crushing plant at Woodlawn, N. C., was completed and put in operation about September 15. It is said to be a modern plant of 400 tons daily capacity. R. V. Wilson has charge as superintendent, with R. L. Carpenter as assistant manager. A force of 40 state convicts has been employed on the job since operations began. Agricultural limestone will be made and sold at $1 per ton f.o.b. plant. A local newspaper makes this naive comment:

"With the new AAA soil conservation program providing payment of $2.00 per ton to farmers in this section for the application of limestone to certain kinds of crops, it is expected that many times as much limestone will be used hereafter in the three counties than ever before. In fact, some authorities on the subject expect the new plant will have to run to capacity on fine limestone to supply the demand after farmers within trucking distance of the plant realize the great advantage of applying limestone to their land at this very low cost."

Releases Some PWA Funds

PRESIDENT ROOSEVELT on September 8 and 12 made allotments of $7,438,338 and $7,721,116 respectively, as well as loans of $317,000 and $195,000 drawn partly from the new appropriation of $300,000,000 made by the last Congress. The September 12 allotments were the first to be made wholly from the new appropriaton. All of these grants were for 45% of project cost.

Assurances that the $300,000,000 program of non-federal Public Works Administration projects "will go forward without interruption" were given by President Roosevelt in a letter dated September 8 to U. S. Representative Alfred F. Beiter, of New York, who led the fight in Congress to earmark the $300,000,000 for projects of the PWA type.

Representative Beiter had forwarded to the President a letter he had received from Edward J. Harding, manager of the Associated General Contractors of America, pointing out that the best construction season is slipping by and asking what could be done to get the program under way "in accordance with the terms of the authorization and the intent of Congress."

The full text of the President's letter follows:

"I have your letter of August 21, with which you inclosed a communication that Edward J. Harding, managing director of the Associated General Contractors of America, wrote you.

"The Associated General Contractors have shown a keen interest in the public works program and I am not unmindful of that interest. You may tell Mr. Harding that from time to time I shall continue to approve additional projects for inclusion in the Public Works Administration program, which will go forward without interruption.

"Recently I approved PWA projects amounting to approximately $22,000,000, on which construction will start within the next few weeks. I expect to announce an additional group shortly.

"As all these projects will be constructed through the agency of general contractors, I am sure that they will have a beneficial effect upon the construction industry."

Cooling tower and power house at Columbia Quarry Co., Krause, Ill., plant

MAKES INSTEAD OF BUYING POWER

Columbia Quarry Co. Installs Latest in Diesel-Powered Generators

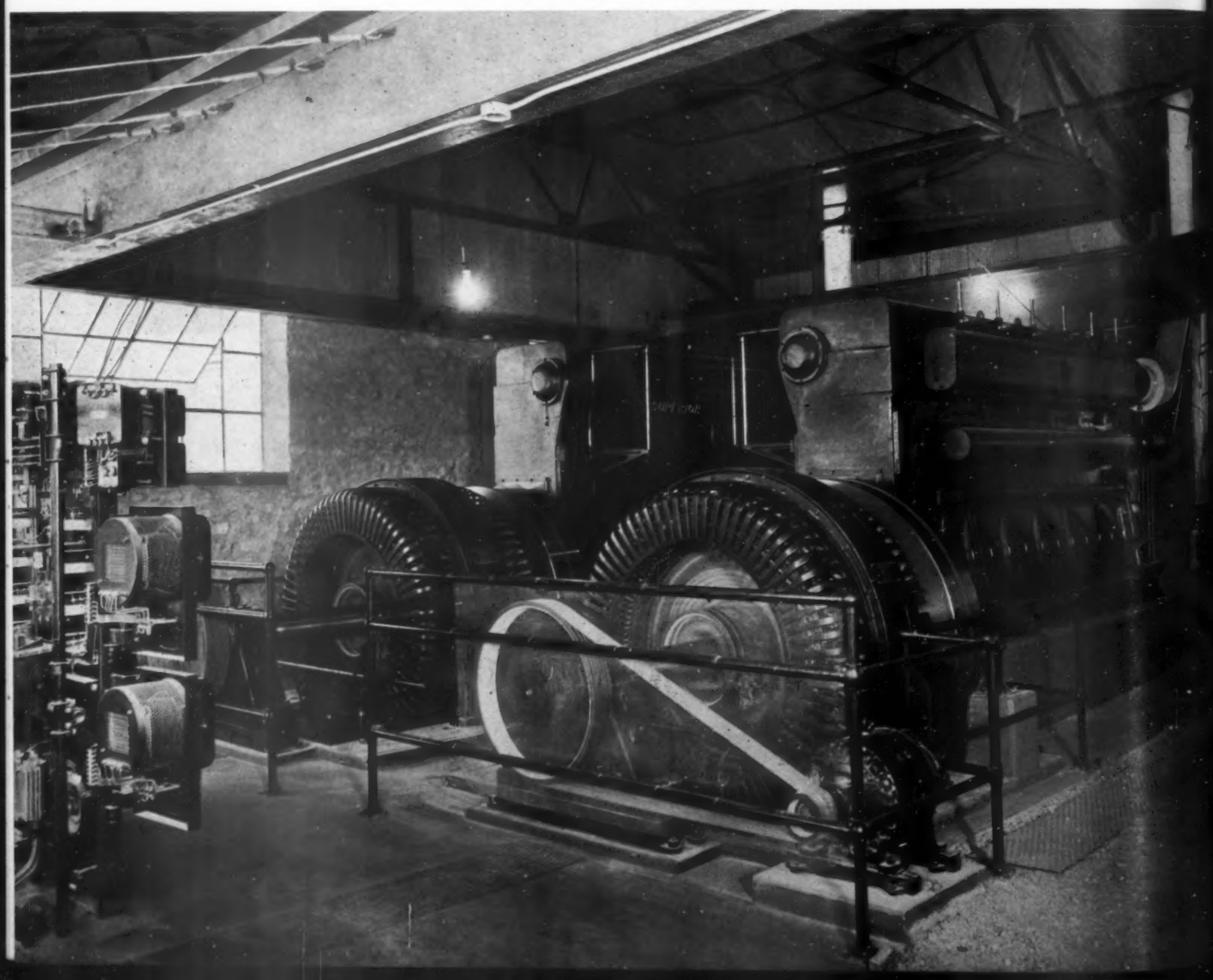
OFFICIALS of the Columbia Quarry Co., St. Louis, Mo., were confronted with a serious power problem at the Krause, Ill., plant in July, 1936, when the source of electrical power was discontinued.

The East St. Louis, Columbia and Waterloo Railway had been furnishing 25-cycle electricity to the plant from its electric-traction line, until its bankruptcy.

The Columbia Quarry Co. was faced with the problem of either re-winding all motors for 60-cycle electrical power and purchasing such energy from the Illinois Power and Light Co. at a higher kilowatt-hour rate, or installing equipment to generate power for the entire plant.

Diesel power was decided upon because of the known economies of such engines, plus the fact that rewinding of all motors would require an outlay of $14,000. Construction of the plant was pushed, and plant load was first imposed on the engines and generators on August 26, 1936. An arrangement was worked out with the receivers of the East St. Louis, Columbia and Waterloo Railway, whereby 25-cycle power was furnished direct from East St. Louis for the period required to install the new engines.

Two Diesel generator sets to drive motors for the entire plant



Gasoline engine driving compressor and compressed air tanks for starting Diesel engines

The Diesel engine fuel oil is stored in these steel tanks near the power house

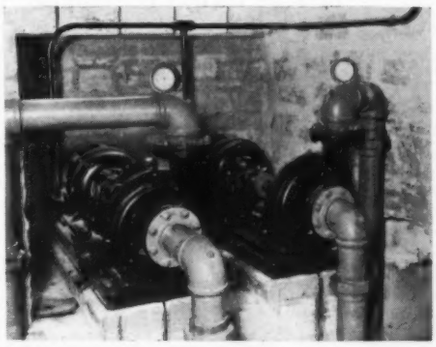
The galvanized iron garage was remodeled, by company labor, to serve as a permanent power plant and to house the air compressors. Dimension rock were taken from the quarry and laid to form exterior and interior walls, to reduce insurance rates and make a beautiful power house, comparing favorably in appearance with modern dwelling houses. By building this type of wall, insurance rates are reduced to the low rate of $130 annually.

Two Power Units

Two 4-cycle, cold-starting, mechanical injection type National-Superior Diesel engines were installed to drive the generators, required to meet full load plant requirements.

The 8-cylinder engine has a power rating of 525 hp., and the 6-cylinder engine is rated at 400 hp. The horsepower ratings are based on 75 lb. m.e.p., giving a large emergency overload capacity. Each engine has a 12½-in. bore and a 15-in. stroke.

The engines are designed to start in a few seconds by compressed air furnished at 250 p.s.i. pressure to all cylinders. The pressure is built up by a size 4 3/16 x 2⅛ x 3½ compressor, manufactured by the Curtis Pneumatic Machinery Co., driven by a type AF, 3¼ x 4 gasoline engine, manufactured by the Wisconsin Motor Corp., through a three-strand V-belt, manufactured by the Gates Rubber Co.



Two pumps handle both the water to be softened and the water to cool the coils

Cooling Water System

The cooling system capacity is 1500 gal., and consists of a combination of soft water, raw water and a cooling tower adjacent to the power house. Previous to the installation of the Diesel engines, a supply of relatively soft water was available for use in other engines. This impounded rain water was pumped from the hillside beyond the quarry to a tank near the plant.

From this tank water flows by gravity to the power house. Here, a 4-in. Deming pump, driven at 1450 r.p.m., by a 10-hp., 3-phase, 25-cycle Robbins & Myers motor through a direct connection, pumps the water through water softeners. These water softeners, manufactured by Wm. B. Scaife & Sons Co., reduce the water to zero hardness. The water is then forced through the cooling system and returns to pass through a triple set of coils at the water tower. Another 4-in. Deming pump puts raw water through the tower to cool the coils. After the system is filled up, water is added occasionally to replace that lost by evaporation.

Fuel Storage and Consumption

A 15,070-gal. steel fuel tank has been erected close to the power house. A 30-gravity Shell Dieselene is the fuel used. A fuel transfer pump removes oil from the large storage tank to the day tank. The oil is fed by gravity through the filter and is injected into the engine by a high-pressure pump.

Fuel consumption is guaranteed not to exceed 0.4 lb. per brake horsepower hour at the rated load, and lubricating

LEFT—The triple set of cooling coils. RIGHT—Details of the cooling tower

Photos by F. D. Hampson, St. Louis

oil usage is guaranteed not to exceed 1 gal. for each 3000-hp. hour. Lubricating oil is filtered and reused.

Electric Generating Equipment

Direct-connected to the 8-cylinder engine and driven at 375 r.p.m. is an Allis-Chalmers a.-c. generator rated at 438 kv.a., 80 p.f., 480 volts, 527 amperes, to deliver 25-cycle, 3-phase electrical energy. The exciter is a 10-kw. Allis-Chalmers, shunt-wound, d.-c. generator, driven from the main shaft through an Allis-Chalmers Texrope drive at 1750 r.p.m.

The 6-cylinder Diesel engine is direct-connected to a 333-kv.a., 480-volt, 400-ampere Allis-Chalmers a.-c. generator, delivering 3-phase, 25-cycle power at 375 r.p.m. The 7½-kw. Allis-Chalmers, shunt-wound, d.-c. generator exciter is driven from the main shaft at 1750 r.p.m. through Allis-Chalmers Texrope drive.

A 3-panel Allis-Chalmers switchboard and control gauges were installed. Equipment includes three trip coils, manufactured by the Condit Electrical Manufacturing Corp.; two Allis-Chalmers Rocking-Contact regulators; two Westinghouse kilowatt-hour meters; and power factor gauges, alternating-current voltmeters and ammeters, direct-current voltmeters and ammeters and kilowatt meters, manufactured by the Weston Electric Instrument Corp.

The crushing plant operates eight months of the year, but power is expected to be produced at a cost of 8 mills per kilowatt-hour as compared to 2.6c for purchased power. It is expected that operation of both engines will generally be required for normal plant operations, but the plant is so wired that either unit or both can be set in operation to meet any plant demand. When the plant load is such that the smaller unit is sufficient, and additional motors are put into operation to exceed this unit's rated capacity, the other unit can be put into operation, or both, if necessary.

A 15-kv.a. lighting unit, driven by a 22-hp. Superior Diesel engine is to be installed for general plant lighting purposes, for lighting of dwellings and for running the machine shop.

Load on Power Plant

The motors listed in the accompanying table are to be driven, in addition to those mentioned in the power house, by the new power units.

ADDITIONAL MOTORS DRIVEN BY NEW POWER UNITS AT COLUMBIA QUARRY CO., KRAUSE, ILL.

Hp.	Type	Make	Purpose
200	Slip-ring	Allis-Chalmers	Drive No. 18 crusher
100	Slip-ring	Allis-Chalmers	Drive 10-in. reduction crusher
100	Slip-ring	Allis-Chalmers	Drive No. 10 reduction crusher
100	Slip-ring	Allis-Chalmers	Drive Symons cone crusher
75	Induction	Westinghouse	Drive No. 18 elevator
60	Induction	Allis-Chalmers	Drive No. 12 elevator
75	Induction	Allis-Chalmers	Drive No. 12 revolving screen
7.5	Induction	Westinghouse	Drive scalping screen
7.5	Induction	Westinghouse	Drive scalping screen
5	Induction	Allis-Chalmers	Drive oversize conveyor
3	Induction	General Electric	Drive screen conveyor
15	Induction	Allis-Chalmers	Drive No. 2 ballast conveyor
25	Slip-ring	General Electric	Drive conveyor
10	Induction	Allis-Chalmers	Drive oversize conveyor
5	Induction	General Electric	Drive shaker screen
5	Induction	General Electric	Drive shaker screen
5	Induction	General Electric	Drive shaker screen
5	Induction	General Electric	Drive shaker screen
15	Slip-ring	Allis-Chalmers	Drive well drill
10	Slip-ring	Allis-Chalmers	Drive well drill
150	Slip-ring	Allis-Chalmers	Drive pulverizer
10	Slip-ring	Allis-Chalmers	Drive dust conveyor
30	Induction	General Electric	Drive elevator
5	Induction	General Electric	Drive screen
40	Induction	Allis-Chalmers	Drive sump pump
75	Induction	Westinghouse	Drive air compressor
40	Induction	Allis-Chalmers	Drive air compressor
5	Induction	Allis-Chalmers	Shop
	For 50-B Shovel		
50-kw. generator set			
15-kw. direct current generator			
4.5-kw exciter (d.-c. generator set)			
7.5-hp. induction motor			

New Quarry

PERRY MCGLOME, North Wilkesboro, N. C., contractor for a section of the Blue Ridge parkway between Laurel Springs and Air Bellows Gap, has opened a quarry for making crushed stone near Laurel Springs.

New Fabricating Plant

TEXAS QUARRIES, INC., Los Angeles, Calif., is to build a $200,000 fabricating plant for the output of its limestone and granite quarries near Madera and Victorville, Calif. The chief products to be made are dimension and monumental stone.

Freak Blast

GENERAL CRUSHED STONE CO., Winchester, Mass., quarry, experienced a freak blast September 3; fortunately, no one was injured. It was described in an Associated Press dispatch in part as follows:

"A terrific quarry dynamite blast propelled big rocks through two houses and a garage today and showered a 3000-ft. area with broken stones that narrowly missed several persons.

"The explosion was the last of five 1200-lb. dynamite charges set off in the quarry. The first four crumbled the face of the 200-ft. deep pit properly, A. J. Seitz, of Easton, Penn., vice-president of the company, said, but the last must have struck a seam or fissure which led at right angles from the face of the ledge.

"A 300-lb. rock catapulted 3000 ft. away from the pit, crashed through a house, passed through the kitchen and broke a closet door where a moment before Orol Sornberger, a cripple, had been sitting.

"Another 50-lb. stone landed in front of the house of James C. Hearne and bounced through a screen door on the porch and into the kitchen."

Making due allowance for the reporter's desire to produce a good story, the incident is interesting in showing how anything may happen in blasting. There probably is no company in the quarry business which exercises more care, or uses more scientific precautions than the General Crushed Stone Co., particularly at this quarry, where blasting has long been a subject of intense study. Yet even so an unexpected seam in the rock formation could not be guarded against.

Wins Safety Competition

COLUMBIA QUARRY CO., St. Louis, Mo., Krause No. 1 quarry, near Columbia, Ill., won the National Crushed Stone Association safety trophy, presented by the *Explosives Engineer*, for the year 1935. This quarry operated 167,671 man-hours without a lost-time accident during the contest period, maintaining its accident-free record of the two previous years, 1933 and 1934. The total operating time during the three years was 502,656 man-hours. There were 18 other quarries that operated without a lost-time accident and therefore will be awarded certificates of honorable mention.

Two Million Ton Order for Aggregates

How Tygart River Reservoir Dam Requirements Are Produced to Meet Army Engineer Specifications; Inspection and Testing

By MAX E. BOYER

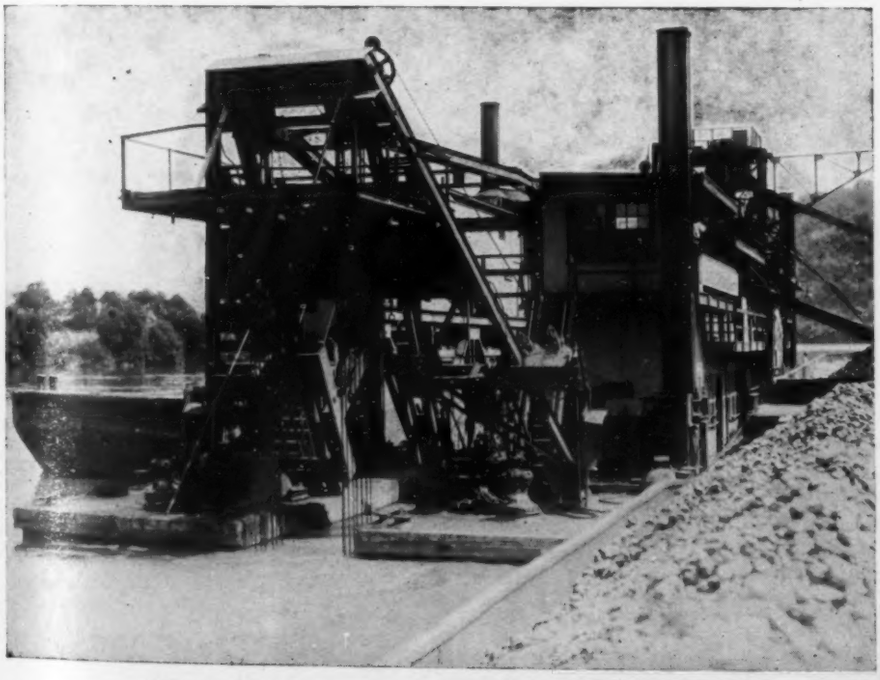
Chief Aggregate Inspector,
U. S. Engineers Office, New Martinsville, W. Va.

SOME 1,904,000 tons of sand and gravel, probably the largest single order ever placed for concrete aggregate, was awarded, during January, 1935, by the Frederick Snare Corp., general contractors for the Tygart River Reservoir Flood Control Dam being built near Grafton, W. Va., to the New Martinsville Sand and Gravel Corp., a sales organization set up to represent a syndicate of upper Ohio River Valley sand and gravel producers, including the Ohio River Sand and Gravel Corp. and the Ohio Valley Sand Co., with loading plants situated on the West Virginia shore of the Ohio River near New Martinsville, W. Va., and their associated companies, the Iron City Sand and Gravel Co., of Pittsburgh, Penn., and the McClain Sand Co., Inc., of Point Marion, Penn.

Dredging is being carried on with the river equipment owned and operated by the Ohio River Sand and Gravel Corp. and the Ohio Valley Sand Co.; and sizing, washing and loading completed at their New Martinsville plants. The associated companies will furnish any material required in excess of the capacity of the New Martinsville plants. Shipment is made via the B. & O. railroad, which provides direct connections for the 74-mile haul to the damsite at Grafton.

The present operating schedule calls for dredging between stations 12 miles below and 28 miles above New Martinsville. Should it become advisable to carry on dredging operations in locations not readily accessible to New Martinsville, shipments can be made from Wheeling, W. Va., 40 miles upstream, and Parkersburg, W. Va., 50 miles down stream, through loading plants, and operated by the Ohio River Sand and Gravel Corp.

The aggregates occurring in the upper Ohio River are composed largely of glacial residue with some native or local stone. The glacial material, residue of the Labradorian Ice Sheet, consists principally of eastern Canadian and Labradorian granite, Medina sandstone and southeastern Canada and New York fresh-water limestone. The native stone is a breakdown of the adjacent coarse sandstone and fresh-water limestone. Previous counts in the upper Ohio River have shown chert, shale and slate; but to date no objectionable quantities of these materials have been encountered by the local dredges.



View on Iron City company's bucket dredge "Elizabeth Pfeil"

Investigation of these aggregates carried on over a period of years by the War Department Engineers in connection with the construction of navigation control dams and miscellaneous hydraulic structures in the upper Ohio River, and more recent tests by the U. S. Engineer Aggregate Control Labratory at New Martinsville, indicate a material suitable for a structure of the character of the Tygart dam, except for a shortage in the sand of material passing the No. 48 and No. 100 screens. While it was known that limited deposits of sand, generally in the form of occasional bars, meeting the specification requirements, were to be found in the river, the extent of this source of supply had never been accurately determined.

Making Specification Sand

The considerable interest evidenced by visiting aggregate producers and engineers in the details of the methods by which specification sand is being obtained for this job and the developments leading up to the adoption of these methods prompt the following detailed description.

The variation of the apparent natural river sand gradation from the specified requirements caused the producers, at the time they were bidding for the order, to consider several types of the sand classifiers available with the idea of bringing the sand up to specification. However, no decision was reached at the time, and early in the spring of 1935 the producers placed in service a small bucket ladder dredge for the purpose of prospecting the various bars and sections of the river over which they proposed to operate. United States Engineer Department inspectors accompanied the dredge to obtain gradation analyses and to locate and chart acceptable sand.

As this work progressed it became evident that the supply of desirable sand was very limited and entirely in-

adequate to meet the requirements of the job. Frequently when located, the bars, which were generally below the mouth of small creeks and washes, contained an undesirable quantity of silt, leaf mould, and other deleterious materials which had washed down from the adjacent hillsides. It was observed that this condition became considerably aggravated during the rainy season and in high water.

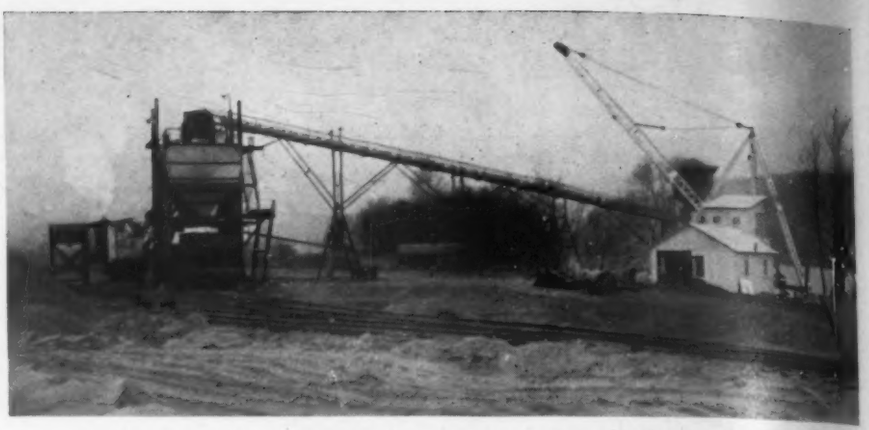
The investigation also indicated that there was little or no acceptable gravel to be found with the fine sand. It was further noted that when the necessary fines (passing the No. 48 and No. 100 screens) were found, there was frequently an excessive amount of sand passing the No. 28 screen and retained on the No. 48 screen. From this it became apparent that mechanical means would be required to provide a sufficient quantity of specification sand.

Install Sand-Crushing Rolls

The producers desired to carry out this additional operation on the dredges and as the installation of any of the generally accepted hydraulic classifiers would require extensive changes on the dredges, crushing rolls were considered. As the result of tests made at the factory of the New Holland Machine Co., New Holland, Penn., the Ohio River Sand and Gravel Corp. secured a set of New Holland Type A 10-in. sand crushing rolls with a capacity of 3 to 5 tons per hour, and mounted them on one of the small dredges in such manner that the larger sizes of sand and small gravel or shot could be fed from the rotating screens to the rolls by gravity, and the crushed material washed down a chute into the sand box. A high degree of turbidity in the sand box indicated that a thorough mixing of the crushed and natural sand would result; and inspection of the combined sand after reaching the barge bore this out. This procedure made it possible to produce sand while dredging acceptable gravel. Incidentally, the sand found with the better grade of coarse gravel, while very coarse, was superior in general character to the finer sand previously investigated.

Observation of the gradation of the natural river sand and the gradation produced by the crushing rolls indicated the per cent of crushed material that should be added to the natural river sand in order to meet specified requirements. A typical analysis is shown on Table 1.

The gradation of the crusher product shown in Table 1 was the result of grinding the natural river sand shown in the same table. Further investigation indicated that an increase in the percentage of No. 4 and No. 8 material in the sand passing through the rolls resulted in an increased percentage of fines (through No. 48 and No. 100 screens). Carrying out this same idea it was found that by eliminating the smaller sizes of sand and passing shot or pea gravel (passing the ⅜-in. screen and retained on the No. 8 screen) through the rolls, the percentage of fines was 300% to 400% greater than could be obtained by crushing river run sand. An analysis of the job requirements and production of fines expected from the several styles of crushers indicated that two sets of 24-in crushing rolls would furnish sufficient fines to provide for the Ohio River Co.'s share of the maximum requirements.



Loading derrick for sand and small gravel, Ohio River Sand and Gravel Corp.

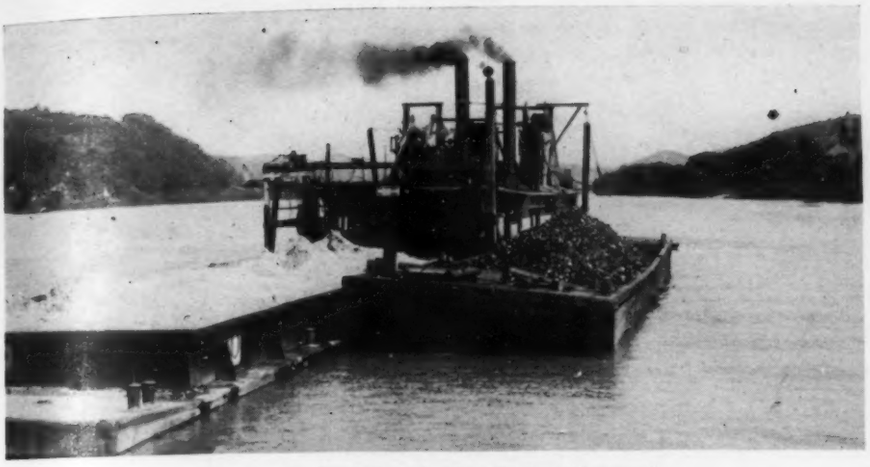
TABLE 1—NATURAL AND CRUSHED SAND

Screens	Specified Cum. % Ret.	Natural river sand Cum. % ret.	Crusher product Cum. % ret.	Combined 15% crusher 85% natural Cum. % ret.
⅜ in.	0	0	0	0
No. 4	0-5	5.0	1.0	4.4
No. 8	—	15.0	17.0	15.3
No. 14	25-65	34.0	47.0	34.9
No. 28	—	52.2	65.0	54.1
No. 48	75-90	86.2	83.0	85.7
No. 100	93-98	98.2	92.0	97.3
Pan	100	100.0	100.0	100.0

To eliminate the necessity of equipping three and possibly four dredges with rolls, two sets of Type A 24-in. New Holland manganese shell rolls were mounted on the shore over the sand loading tracks in such manner that sand could be delivered by the loading derrick directly from the barge to a two-compartment bin above each set of rolls. The rolls are fed by a No. 3, and the by-pass by a No. 7, Jeffrey-Traylor electric vibrating feeder, permitting positive control of percentages. Mixing of the natural sand and crushed material is accomplished by gravity as the sand is chuted to the cars. The output of one unit may be loaded direct to a stock pile by means of a 24-inch belt conveyor.

The two-compartment bins were provided to permit feeding shot to the rolls

Sand crushing rolls and bin, photographed when installation was first made



Ohio Valley Sand Co.'s bucket dredge "Panama"

and natural sand to the by-pass. However, to eliminate the inconvenience of making an additional separation on the dredges and barging an additional size of material, which would be required in only comparatively small amounts, the natural river sand is produced with the maximum allowable percent of No. 4 material and fed to the rolls as well as the by-pass. The two sets of rolls have each a per hour capacity of 10 tons of crushed material of approximately the gradation shown in Table 1, with a resulting combined per hour output of 150 tons of specification sand.

The Ohio Valley Sand Co. preferred to carry out the sand crushing operation on its dredge. Apparently one set of rolls would produce sufficient sand to meet its allotment of the maximum requirements. The dredge was equipped with a set of Type A 24-in. New Holland manganese shell rolls. The coarser particles of sand and shot pass to the rolls from the rotating screen by gravity, and the crusher product is delivered by gravity to the sand box. The flow of natural sand from the screen to the sand box and flow of coarse particles to the rolls is controlled by manually-operated gates. This installation has a capacity of 60 tons of specification sand per hour.

Proration of Production

At this writing the maximum concrete production of 5000 cu. yd. per day was scheduled for the spring and summer of 1936. This requires approximately 2250 tons of sand daily. The 24-hour capacity of the present equipment with an operating efficiency of 75% would be 3780 tons per day. However, the sand loading tracks at the Ohio River Sand and Gravel Corp.'s plant are also used in connection with loading No. 4 to 1-in. gravel, which will reduce the operating time of the sand plant to approximately 14 hours per day. On this basis the maximum combined output of the two New Martinsville plants will be 2650 tons per day, assuming 75% operating efficiency, as compared with maximum requirements of 2250 tons per day.

The several producing companies involved have river equipment available as follows:

The Ohio River Sand and Gravel Corp.

One steam bucket ladder dredge, capacity ..... 225 t.p.h.
Three steam bucket ladder dredges, capacity 100 t.p.h. each ..... 300 t.p.h.
Attendant craft:
Five tow boats, 75 to 100 hp.
Twenty steel barges, 400 t. to 500 t. capacity each

The Iron City Sand and Gravel Corp.

One Deisel-electric bucket ladder dredge, capacity.... 300 t.p.h.
Attendant craft:
One tow boat, 600 hp.
Twenty steel barges, 500 t. each

The Ohio Valley Sand Co.

One bucket ladder dredge.... 100 t.p.h.
One screening boat attended by derrick boat with clam shell ..... 75 t.p.h.
Attendant craft:
Two gasoline and Diesel tow boats, 35 and 100 hp.
Seven wood barges, 125-150 t. each
Eight steel barges, 350-500 t. each

The McClain Sand Co., Inc.

One steam dipper dredge..... 150 t.p.h.
Attendant craft:
One Diesel tow boat, 40 hp.
Two steel barges, 350 t. each
Four wood barges, 150 t. each

Total available dredging capacity .....1150 t.p.h.

The above ratings are based on the normal digging or dumping capacity of the dredge buckets.

The gravel is separated and shipped in three sizes as follows:

Passing 4 in. Retained on 2 in.
Passing 2 in. Retained on 1 in.
Passing 1 in. Retained on No. 2

Not less than 85% of any separation shall be retained on a standard square mesh screen of the minimum size indicated and not more than 5% shall be retained on a standard square mesh screen of the maximum size indicated.

The grading of the coarse aggregate after the several sizes have been combined in the mixed concrete shall fall within the following limits:

	Per cent by weight passing
Maximum size (4 in. square mesh)	97-100
½ Maximum size (2 in. screen mesh)	40-70
Minimum size (No. 4 standard screen)	0-6

An analysis of the gradation of the natural run of river material compared with the specified required gradation indicates the percentage of total material dredged which can be applied on the Tygart River Reservoir Dam contract. Referring to Table 2, which illus-

Yard at the New Martinsville plant of Ohio River Sand and Gravel Corp.

trates a typical condition, it becomes apparent that the factor controlling production is the percentage of 4-in. gravel in the run-of-river material.

Each dredge on the operation has provisions for screening and separation of sand and two sizes of gravel. The Ohio River Sand and Gravel Corp. has followed the practice of producing sand, No. 4 to 1-in. and 1-in. to 4-in. gravel on the dredges. The separations are made over ⅝-in., 1⅛-in. and 6-in. square mesh screens. An occasional excess of plus 4-in. material has necessitated temporarily replacing 6-in. screens with 5-in. screens reducing the per cent of plus 4-in. cobbles to within the specified allowance.

Handling Dredged Material

The 1-in. gravel is loaded directly from barge to cars by an electric steel stiff-leg derrick with 87-ft. boom and 2-yard clam-shell. This derrick also handles sand from the barges as previously described. For emergency or relief loading at this point the whirley servicing the sand and 1-in. gravel stock piles may be moved out to the water's edge, adjacent to the loading tracks. Empty cars are shifted into position for loading with a Plymouth 30-ton gasoline locomotive; and loaded cars are moved by gravity to storage tracks where provision for 30 cars has been made.

The 1-in. to 4-in. gravel is unloaded by an electric, steel, stiff-leg derrick with 87-ft. boom and 2½-yd. clam-shell to a 30-ton hopper bin, fed from the hopper to a belt conveyor through a No. 7 Jeffrey-Traylor vibrating feeder, and discharged on to a 4-ft.x8-ft. direct motor driven Simplex triple deck, 200-ton per hour capacity, vibrating screen. The Simplex screen is mounted over a three-compartment steel bin of 200-ton capacity. The separations are made over 2¼-in., 1⅛-in. and No. 4 square mesh screen. The 1⅛-in. to No. 4 material does not meet the specified gradation, and is disposed of through commercial sources.

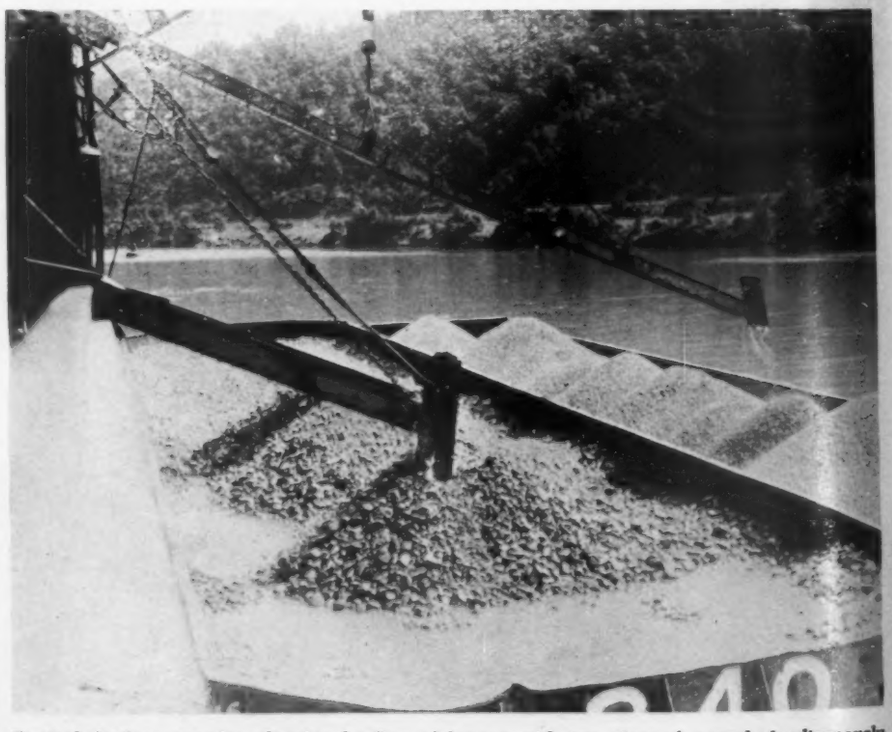
Spray washers over the Simplex screen waste to the river bank, where the minus No. 4 particles of crushed stone are periodically dredged and passed through the sand crushers.

Loading tracks are located under and to one side of the gravel bins. Cars are shifted into position by the gasoline dinky, loaded by gravity and moved by gravity to the storage tracks, where 30 loaded cars can be accommodated. The loading chutes are equipped with "Maytags," or spray washers; and final washing is given the gravel as it passes to the car. The gravel is left free of any coating which might have resulted from the breaking up or crushing of soft material in the bins.

Gravel screening plant and loading bins of Ohio River Sand and Gravel Corp.

The Ohio Valley Sand Co. set up its plant to make all gravel separations on shore. The bucket dredge produces sand and No. 4 to 4-in. gravel, and the screening boat produces No. 4 to 4-in. gravel. A steam, wood, stiff-leg derrick with 80-ft. boom and a 1½-yd. clam-shell bucket unloads sand barges into a 2000-ton capacity concrete-lined draining pit adjacent to the sand loading track. The sand drains to a moisture content of approximately 3%; and is loaded from the pit direct to cars by the same derrick. Cars are shifted by a Vulcan 30-ton, saddle-tank, steam locomotive. Gravel is transferred from barges to a 20-ton steel hopper bin with the aid of an electric, steel, stiff-leg derrick with 75-ft. boom and a 1¾-yd. clam-shell bucket and is fed from this supply hopper to a 30-in. belt conveyor by means of a No. 7 Jeffrey-Traylor vibratory feeder.

The conveyor belt discharges into a chute leading to a 46-in.x22-ft.0-in. revolving screen. A 30-in strip of ¾-in. square mesh wire is fixed in the bottom of the feed chute between the conveyor and revolving screen and sufficient No. 4 to ¾-in. material is drawn off to meet the requirements of a nearby reinforced-concrete pipe plant. The revolving screen is mounted over a 500-ton, three-compartment bin; and the separations are made over No. 4, 1⅛-in. and 2¼-in. square mesh wire. Wash water from the screen carries the minus No. 4 material to the river bank. Loading tracks located under and to one side of the bin provide for gravity loading.



Typical dredge operation showing loading of barges with two sizes of gravel simultaneously

TABLE OF CONCRETE MIXTURES

Screen Size	TYPICAL COMBINATION IN MIXED CONCRETE									Percent by Separations	Natural run of river					
	28.70% Designation 4 in.		22.50% Designation 2 in.		22.50% Designation 1 in.		26.30% Sand		Totals Percent		Sample "A"		Sample "B"		Sample "C"	
	Ret. %	Cum. %	Ret. %	Cum. %	Ret. %	Cum. %	Ret. %	Cum. %			Ret. %	Separation	Ret. %	Separation	Ret. %	Separation
6 in.	0	0							0.0		0.0					
4 in.	5	5							1.4	28.30	0.6	7.3				
3 in.	45	50							12.9		1.0					
2 in.	45	95	5	5					14.0		5.6					
1½ in.	5	100	45	50					11.6	22.9	4.3	11.3				
1 in.			45	95	5	5			11.3		7.0					
⅝ in.			5	100	45	50			11.3		10.7					
⅜ in.							0	0		22.2	13.7	36.4				
No. 4					45	95	3	3	10.9		12.0					
No. 8					5	100	9	12	3.5		12.6					
No. 14							15	27	3.9		9.1					
No. 28							20	47	5.3		10.8					
No. 48							38	85	9.9	26.6	10.3	45.1				
No.100							12	97	3.2		1.4					
Pan							3	100	0.8		0.9					

The discrepancies between the "Combination of mixed concrete" percentage and the figures shown under "Percent Total" are due to the drag or lag below and above the separation point screens.

Bottom and side loading chutes from each compartment are equipped with "Maytags," and all gravel receives a final washing as it passes to the car. For emergency and relief loading a steam derrick boat with a 90-ft. boom, which can reach either the sand pit or gravel feeder hopper, has been provided. Cars loading under the gravel bins are shifted by the steam dinky. A No. 1591 Browning steam locomotive crane used at the stock piles is used as a relief shifter. The storage tracks have a combined capacity of 30 loaded cars.

Stock piles totaling 100,000 tons and 50,000 tons in proportionate sizes are maintained at the Ohio River and Ohio Valley plants, respectively. The same general procedure in stocking and reloading is followed at both plants in that material designated for stock is loaded to 30-ton Western side-dump cars, and deposited in concrete lined pits adjacent to the running tracks.

The Ohio River Co. has provided two steam whirleys with 75-ft. booms and 1½-yd. clam-shell buckets, one each adjacent to the running track loading from the sand crushing plant and 1-in. gravel loading derrick, and to the running track from the gravel screening plant. The stock piles are built up in 3-ft. layers to a height of approximately 40 ft. In addition, sand can be stocked to a height of 50 ft. under the belt conveyor leading from the crushing rolls. The aggregates are reclaimed by the whirleys and loaded to cars on the running tracks. Any material beyond the reach of the whirley can be cast in by a No. 206 P&H caterpillar crane with a 38-ft. boom and ¾-yd. clam-shell.

Gravel when reclaimed from stock piles for shipment is loaded to cars through a wood hopper bin of approximately 10 tons capacity, mounted on a timber frame. The aggregate passes from the bin to the car by gravity through a chute fitted with a "Maytag" or spray washer, and is left free of the accumulated coating of dust and crushed stone. The entire unit may be picked up by a whirley or locomotive crane and moved about the job. Water connections are made through a 1½-in. hose to a convenient valve in a 2-in. water line adjacent to the loading track.

The Ohio Valley Co.'s stock piles are built up and reclaimed with a locomotive crane operating on the running track. Any material beyond reach from the running track may be reclaimed from adjacent storage tracks. Coarse aggregate reclaimed from stock piles is washed and loaded through a unit similar to that described above.

Shipment is made in 70-ton, bottom-dump, steel hopper cars; and switched to the New Martinsville yards over a new track scale installed by the B. & O. railroad during the late winter of 1935 in anticipation of this operation. Loads are billed at the track scale weight. The B. & O. has assigned to the job 700 such cars permitting several hundred loads to accumulate at the damsite and at the same time assuring an adequate supply of empties. Cars shifted from the producers' yard by midnight are delivered to Grafton early the following morning.

Production Personnel

Operations at The Ohio River Sand and Gravel Corp.'s New Martinsville plant are under the supervision of Frank Barth, general superintendent, and L. E. Goerder, superintendent; B. C. Board, manager of the Wheeling plant, also supervises new construction and major changes to equipment at the New Martinsville plant. T. M. Bowers is general superintendent, and P. B. Emch, superintendent, of the Ohio Valley Sand Co.'s New Martinsville plant.

Inspection and Tests

Inspection, particularly as designed to insure control of gradation, is impracticable at any location other than the source of supply, and the nearer the actual source, the fewer will be the rejections. Furthermore, when the source of supply is at all distant from the site of construction, there is also to be considered the item of freight on material rejected at the terminus, which would no doubt have to be borne by the shipper. In consideration of the advantages accruing to the producers, the Aggregate Control Section which is stationed at the source of supply is charged with final inspection and acceptance of all aggregate.

Shortly after being awarded the order, the several producers involved submitted sketches of shore plant layouts, detailed descriptions of dredging and towing equipment, and an outline of the production methods they proposed to follow. With this information available, a tentative inspection routine was drafted. Approximately 30 days prior to the date on which production was scheduled to start, the chief inspector to be in charge of the Aggregate Control Section visited the site of operations for the purpose of familiarizing himself with the various plants and equipment, and discussed production routine and inspection methods with

the producers' superintendents and production engineers. As a result of these discussions, a more detailed inspection routine which would permit the determination of the status of material with regard to specified requirements in the earlier stages of processing was worked out, thus insuring against the passage of undesirable material through additional operations. As the job progressed, it was found possible and practical to eliminate objectionable features that from time to time develop in the aggregate by minor changes in equipment, methods, and location.

Details of the inspection personnel were completed, construction of a laboratory building started, and the necessary equipment ordered. During the erection of the laboratory and the installation of the equipment, an inspector who had become familiar with the proposed routine was stationed at the site. Sufficient equipment to permit preliminary testing was made immediately available; and, as changes to the existing plants were completed and new features installed, tests were made to determine the nature of the results which might be expected. This inspector also carried on tests at the dredges during prospecting trips, and made the earlier tests in connection with the development of the present sand producing practice. About 10 days prior to the date scheduled for routine production, the chief inspector took residence at the site, additional inspectors were made available, and several boys, recently graduated from the local high school, were obtained through the State Re-employment Service to be broken in as sample boys and laboratory assistants.

A relatively large volume of material in several different forms is subject to tests; and to facilitate these operations and avoid confusion, the laboratory routine and equipment has been set up on a production basis. A full complement of glass ware, testing sieves, drying ovens, and scales is available. Other equipment consists of a Tyler "Ro-Tap" sand sifter, a Tyler "Ty-Lab" gravel sifter, and a Fairbanks briquette machine. Such open fires as are required are installed under exhaust hoods.

Deleterious Substances in Sand

Regarding deleterious substances in fine aggregate, the specifications make direct reference to shale, coal, clay lumps, chert, and shell. The limit for any of the above and also any other objectionable material which may be found including silt is 2%. The allowable total of all such substances is 5%. Tests to determine the presence of any of the above, including sieve analyses, are carried out in accordance with A. S. T. M. Standards. In addition to a determination of gradation, all samples are submitted to silt, standard color, and flotation tests. Although the specification makes no reference to color, the standard sodium hydroxide test provides a reliable indication of the presence of organic matter and for this reason the test is included.

The established routine for sand designated for the crushing plant provides for: composite sample indicative of the barge average, from which, in order, a gradation analysis, silt test, color test and flotation are made. Should the silt, color, or flotation test indicate the presence of undesirable matter, the barge is rejected, or, when warranted, held pending further investigation. When previous tests on sand from an identical location have been proving satisfactory, the producer is advised of the gradation as soon as the analysis is complete, and the barge unloaded to the sand mill. Sand being loaded for shipment from the mill is checked for gradation approximately, every 20 tons. Periodically, analyses are made of the crushed material directly from the rolls, and the natural sand through the by-pass, and, when desirable, the proportions being fed through each changed. A comparison of these analyses also indicates the efficiency of the mill and the necessity of mechanical adjustments. The name and location of the dredge, barge number, and the results of the several tests and disposition of the load become a matter of permanent record.

An excess of silt is not in itself cause for rejection, but warrants an investigation to determine the amount of organic matter present. In this connection, reference is made to the color test. Although the standard color test requires 24 hours to complete, it has been definitely established that an unsatisfactory color will be indicated within two to three hours. The presence of leaf mould, grain stalks, dead wood, etc., while indicated by a high color, can be definitely determined by flotation, and an excess warrants rejection. A high color from lignite alone is not objectionable. The presence of any appreciable amount of these substances is discouraged. Acid from industrial plants is found in objectionable amounts from time to time, and a high color, resulting apparently from acid, is cause for rejection.

In addition to a gradation analysis, sand loaded to cars for shipment from the sand mill is subject to a sedimentation test. Sand which, at this stage, carries a high percent of sediment entirely free from organic matter, is not subject to rejection, but the tests have been continued in connection with a study of the high per cent of particles which pass a No. 200 screen and which would be classified as silt. It has been found that the minus 200-mesh material resulting from the crushing operation is fairly cubical in shape and comparatively free from splinters and flats, and briquette tests made at the laboratory have indicated that 2 or 3% is not detrimental. Consequently, sand containing as much as 3% of minus No. 200 particles has been shipped to the dam. Further, the result of the sediment test, which is readily visible, is an indication of the efficiency of the crushing rolls.

Sand which has been crushed and mixed on the dredge is loaded in the barges in distinct piles. On arriving at the harbor, each pile is sampled and numbered, the gradation of each pile determined and routine and general procedure as described in preceding paragraphs is carried out. Piles in the barge meeting the gradation requirement are unloaded to a draining pit, stock pile, or direct to cars for shipment. Piles failing to meet requirements are unloaded to a separate stock pile, to be sold for commercial purposes. Sand loaded for shipment from stock piles is subject to screen analysis as a matter of record only, as no rejections for gradation are considered after the sand has been accepted in the barge or delivered to stock piles from the sand mills.

Gravel Inspection

In contrast with the detailed laboratory investigations required by sand, gravel is subjected to considerable visual inspection, particularly regarding the presence of objectionable material. The specifications require "hard, tough, and durable particles free from adherent coating." A direct reference is made to vegetable matter, soft, friable, thin, or elongated particles, in quantities considered deleterious by the contracting officer. The quantity of coal, shale, clay lumps, chert, shell, or any other deleterious substance should not exceed 2% by weight each, nor total more than 5% by weight. Vegetable matter of any nature in any amount is cause for rejection.

The amount of soft, friable, thin, or elongated particles allowable, depends somewhat on the degree of softness, friability, thinness, etc. Soft particles should not be of a quantity or degree of softness which results in crushing during handling or in the mixer, to the extent that an excess of fine particles are created. Any amount of soft material which is such that it will affect appreciably the amount of water required to produce a workable concrete, is objectionable. Soft, friable, or laminated particles subject to a high degree of absorption should not be present in

quantities sufficient to retard placing. The amount of substances considered objectionable at the discretion of the inspection force, is determined by its effect on the concrete in mixing or placing under job conditions.

These investigations as carried on at the dam site have generally indicated that a limit of 2% each by weight for soft, friable, laminated, and flat or elongated particles should be maintained, and the total amount is considered in connection with the 5% limit on deleterious material. Coated particles are investigated to determine the effect of the coating on bond between the particle and the cement. Gravel coated with mud, silt, crushed stone, dust, etc., which will not wash off readily and from which 2% by weight, of the coating material can be scrubbed, is considered objectionable. Certain fresh water limestone particles which have effloresced or are encrusted as the result of leaching, and which have been found to make little or no bond with the concrete, are not permitted in excess of 5% by weight.

Magnesium Sulphate Tests

During the early stage of production, gravel being dredged in various sections of the river was investigated for soundness. As production settled into a definite routine, the investigations were and are continued at periodic intervals. These investigations took the form of an accelerated soundness test through the medium of a saturated solution of magnesium sulphate.

No attempt was made to establish a definite number of cycles or weight loss, as limiting the desirability of aggregate. The procedure has been to include particles of stone of an unquestionable character in the same test with the particles under suspicion, and to continue the test until the sound particles disintegrated, the result being a comparison to usual conditions. Generally the specimen which appeared from visual inspection to be subject to rapid disintegration, failed about as expected.

However, several interesting and unexpected developments resulted, particularly in connection with an unusually sound, dense-appearing fresh water limestone being tested to determine the depth of surface leaching. This material developed shear planes and cracks in unexpected places and disintegrated rapidly. Later concrete cylinders made up of this material and subjected to compression indicated beyond a doubt the undesirability of this formation as concrete aggregate. These tests have also resulted in establishing the relative soundness of the several types of sandstone encountered in classifying "softs" and on several occasions have contradicted the impression gained from visual inspection.

Laboratory Equipment

The presence of objectionable substances or conditions in any appreciable amount can generally be detected by visual inspection, and on occasion samples are obtained, at the dredge or from the barge as it arrives in the harbor, which are submitted to detailed count and laboratory test. From time to time, and particularly as a dredge moves into virgin or unknown material, sieve analyses are made at the dredge for the purpose of determining the efficiency of the screen set up; and when warranted by visual inspection a count for flats, softs, coated particles, etc., is made at the dredge. The laboratory equipment devoted to testing coarse aggregate consists of a job constructed drying oven with a capacity of approximately 2500 lb. of surface dried gravel in 10 hours, a 1000-lb. platform beam scale, a Tyler "Ty-Lab" gravel sifter, a set of sieves graduated from 1½ in. to 4 in. and a homemade insulated cabinet containing a 10-gal. crock over a Bunsen burner for accelerated soundness test.

Inspection at Dredges

Inspection at dredges does not follow a prearranged schedule, but a definite inspection routine is followed from the receipt of the barged gravel in the harbor. On arrival at the shore plant, gravel is sampled which has been sized for shipment at the dredge and designated for direct loading to cars for shipment or to stock pile. A sieve analysis, and counts for coal, shale, slate, softs, flats, laminations, and coated particles are made. Should the sample or barge appear dirty, the silt or coating material is tested for organic matter. All data pertaining to inspection and tests, together with name and location of dredge, becomes a permanent record.

Barges containing gravel designated for the screening plants and requiring two or more separations are subject to visual inspection. Should irregularities be apparent, a detailed investigation as described in the preceding paragraph is made, otherwise the material passes to the screening plant. From this stage on it is principally a matter of gradation. When a dredge moves into an untested or unknown formation, the first run over the shore plant screen is sampled in lots approximately 1000 lb. These samples are obtained directly from the loading chute.

Sieve analyses and deleterious material counts of a 1000-lb. sample have been checked consistently with results obtained from the same sample quartered down to approximately 250 lb., and unless unusual conditions warrant otherwise, the returns from the quartered material are accepted as indicative of what may be expected, particularly regarding screen analyses, from gravel of a like character from the same general location. During routine production, a 100-lb. sample is obtained for approximately every 350 tons from the loading chute, or by trenching a loaded car; and then checked for gradation and deleterious particles. The producer is advised of various deviations from the specification requirement as they occur, and corrective steps are taken.

Aggregate being loaded for shipment from stock piles receives visual inspection for dirt, accumulations of stone dust and small ground particles and coated material. Samples weighing approximately 200 lb. are taken for every 500 to 700 tons loaded out of stock, and gradation checks for laboratory records are made. These analyses will also detect segregation which may have occurred due to stocking or reclaiming methods.

Shipping records indicating the gradation of each car and the amount of the several deleterious substances contained in the cars are forwarded daily to the concrete technician at the Dam. The daily average gradation of sand and the several sizes of gravel being produced by the individual plants are compared each 24 hours, and, by co-ordinating the screening operations of the several plants and dredges a uniform gradation can consistently be delivered to the dam. Appreciable variations from the curve are rectified through screening plant adjustments.

Inspection Personnel

The inspection personnel consists of a chief inspector and one inspector for each of three 8-hour shifts. Laboratory assistants and sample boys work four 5-hour shifts, which are staggered so as to provide laboratory service 24 hours a day.

The laboratory is organized as a department under the chief concrete technician at the Tygart River reservoir dam, J. I. Bowman. C. H. Wagner is resident engineer and Lt. W. E. Potter, engineer officer in charge.

British Magazine

Sands, Clay and Minerals. A British magazine, published by A. L. Curtis, P. O. Box 61, Westmoor Laboratory, Chatteris, Cambs., England. This periodical, in its second year of publication, is said to have secured a circulation in some 30 countries. Among other subjects, in the August issue received are articles on refractory cements for different temperatures, concrete aggregates, British sand, gravel deposits.

LIMESTONE PLANT'S EVOLUTION

Columbia Quarry Company's Valmeyer Operation Develops To Meet Demand for Specialties

PLANT No. 3 of the Columbia Quarry Co., at Valmeyer, Ill., has undergone several evolutionary changes since first being placed in operation in 1918. Originally the plant was designed to produce limestone for chemical purposes. Production was limited to fluxstone and ¼-in. minus screenings or agstone (agricultural limestone). The gradual evolution has permitted the production of all sizes of stone down to 99.7% passing the 325-mesh screen.

Originally rock was mined by open quarry methods and shipped without washing. In 1922 washing equipment was added to give a cleaner product. In 1925 the company changed to underground mining, which gave a cleaner stone that was again marketed unwashed.

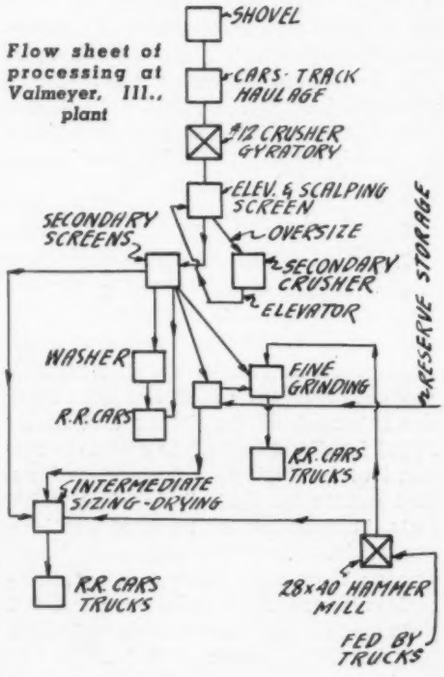
In 1929 a fine grinding plant was added to produce sizes of rock other than large fluxstone and ¼-in. minus. A 5-roll, high-side Raymond mill was installed at that time to pulverize ¼-in. plus rock to 200-mesh fineness. This fine product has a ready market for filler in fertilizers, for rock-dusting in coal mines, etc. Another 1930 improvement was the addition of a ring-roll crusher, manufactured by the American Pulverizer Co., to make agricultural stone (¼-in. minus.)

No further changes took place until 1934, when a second underground mine, the "White Rock Mine," a short distance away, was opened for the purpose of taking out a limestone whiter in color and of different chemical composition, to meet certain requirements.

Fine Ground Pure Stone

At first this rock was processed in the original plant, to which additional screens and a 4-ft. diameter by 30-ft. dryer were added. This rock is used in livestock feed mixes and has other applications. By the installation of screens it was made possible to size rock finer than 4-mesh into 8-, 10-, 16-, 24- and 30-mesh sizes.

Flow sheet of processing at Valmeyer, Ill., plant



An increasing demand for such rock resulted in an "intermediate" plant being installed in 1936, to eliminate all the plant changes made necessary in switching from the handling of one type of rock to the other, and to make possible the processing of both kinds of rock at one and the same time.

A 28x30-in. new type hammer mill, manufactured by the American Pulverizer Co., was installed to crush "White Rock." This hammer mill is driven by a 50-hp. General Electric motor. The relation of this equipment to the plant proper can be seen by a study of the accompanying flow-sheet.

At present, mine-run rock is hauled directly by truck from the mine to the crusher, and approximately 15 tons per hour of this rock is reduced to minus 10-mesh size in one operation.

The crushed rock is elevated by a 51-ft. c. to c. bucket elevator, driven by a 10-hp., G.-E. motor, to a 3x8-ft. Universal sizing screen. Oversize rock is returned through a chute for recrushing, while the sized material passes on to the dryer, where its moisture content is reduced from 5% to less than ½ of 1%.

Poultry Grits, All Sizes

The dried product is screened over a 3x8-ft. Universal screen, covered with the necessary cloth to give required sizes.

A 2½- by 4-mesh size is sold for turkey grits, a 4- by 8-mesh for hens, an 8- by 10-mesh for chicks, and a 10x16-in. for birds. Any combination of sizes down to 24-mesh can be sold for poultry

Columbia Quarry Co.'s plant at Valmeyer, Ill.

feed mixes and other uses. These products are packed in 10-, 25-, 50- or 100-lb. paper bags and in 50-, 75- and 100-lb. burlap sacks, or shipped in bulk.

Several months ago a 4-by 12-ft., double-deck Robins Gyrex scalping screen was added to replace a 5-ft. diameter by 25-ft. rotary scalping screen to effect more accurate sizing and to increase capacity. This screen is equipped with 4-in. and 2-in. square openings. All rock over 2 in. passes to the secondary crusher.

Stone Washing Equipment

A 3 by 10-ft. single-deck Robins Gyrex screen, with 3/16-in. openings was added, to wash all rock before loading cars. The source of water supply is Moredock Lake, on which the company owns adjoining property. The pumping distance is too great for every day use, so a 24-ft. by 65-ft. concrete settling tank was built, adjacent to the plant, to permit re-use of wash water. The settling tank is divided into three compartments, separated from each other by a baffle arrangement to assist in the settling out of fines and clarification of wash water for re-use. A 4-in. centrifugal pump driven by a 10-hp. direct-connected motor pumps water ¼ mile from the lake to the settling basin. When the basin is filled, the pump is cut out, and a 25-hp. motor drives a centrifugal pump with 4-in. suction to supply a 25-ft. head at the screen.

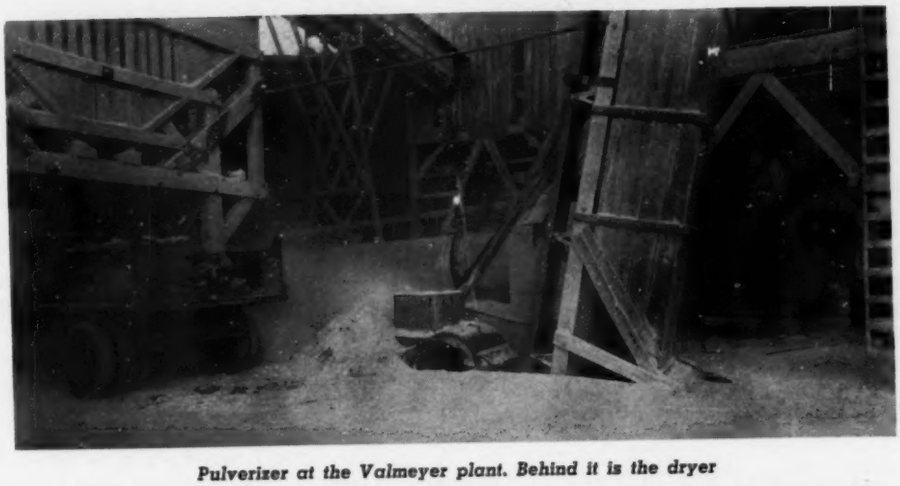
Water and sediment are flumed out to the first compartment, passes to the second and then the third compartment, from which clear water is repumped to the screen. At present the settled fines are removed from the tanks by a clamshell bucket and are used for maintaining and surfacing the company's roads. Approximately 50% of the settled fines are minus 40-mesh material. Since installation of the washer, fines in a car of fluxstone have been reduced from 1½% to less than ½ of 1%.

Preventing Segregation in Loading

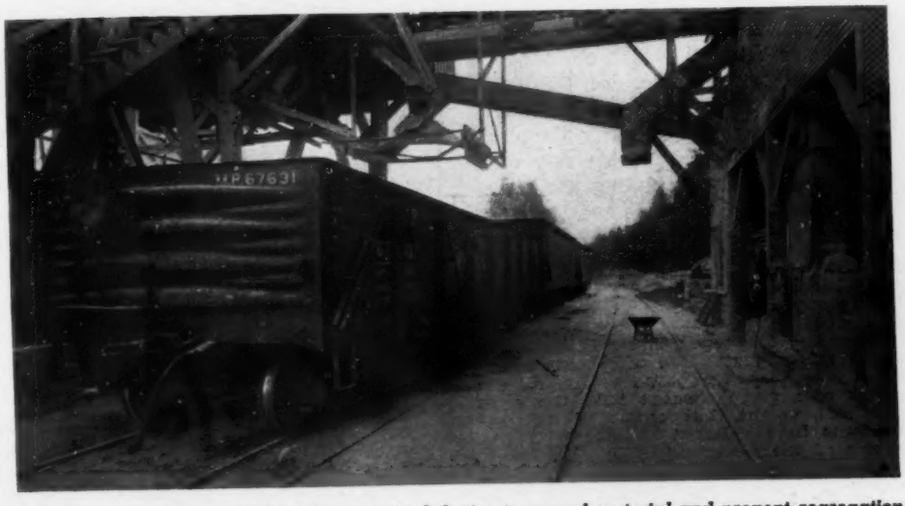
Many plant operators are faced with the problem of eliminating the segregation of fines from the coarse rock, when the rock is dropped from the bin chutes to the cars. This company has done away with this problem by installing a home-made device in the shape of a half-cone, with its apex at the point of discharge from the chute. The device is 7 ft. wide and 7 ft. high, with ridges on its outer surface, which become farther apart near the base.

Material discharging on the apex is guided by these ridges and must follow the direction in which it starts to flow, spreading out uniformly with a resultant homogeneous pile of rock in the car.

Vibrating scalping screen recently installed



Pulverizer at the Valmeyer plant. Behind it is the dryer



Loading arrangement which includes conical device to spread material and prevent segregation

Renews Lease

CENTRAL ROCK CO., Lexington, Ky., has made a 5-year renewal of its lease on the quarry on Old Frankfort pike. Under the terms of the lease, the rock company must pay 10 cents a ton for all rock quarried from the property and must guarantee 10,000 tons or $1,000 annually to the owners. The company is authorized to use, construct or remove any buildings on the property which may be deemed necessary in order to carry on its work.

New Operation

R. NEWTON MCDOWELL, INC., Kansas City, Mo., is operating one of his movable crushing plants at a quarry in Princeton, Mo., to supply 6000 tons of maintenance stone for local farm-to-market roads.

Chemists' Corner

A SIMPLIFIED METHOD FOR CHEMICAL CALCULATIONS AS APPLIED TO THE LIME BURNING PROCESS

By H. M. Rivers

THE CALCULATIONS involved in the quantitative application of scientific data and methods to the lime burning industry are, for the most part, regarded to be so intricate and complicated that none but an experienced mathematician dares to attempt their solution. It is indeed unfortunate that such an erroneous idea prevails, for not only are the calculations themselves comparatively simple, but the theoretical chemical principles which govern their use are well within the understanding of the average lime-plant executive. The difficulty lies, not with the mathematical operations of the problems, but rather in getting the different variables of each system into such a relationship that they can be dealt with by elementary arithmetic. And it is in this connection that the so-called "molal method of calculation" finds its utility in the solution of lime plant problems.

A chemical reaction is one which takes place between atoms, either singly or in groups as molecules. Since the reactions with which we are concerned in lime burning are primarily chemical, atoms and molecules provide very convenient units for calculating the quantitative behavior of these reactions.*

Editor's Note

THE AUTHOR supplies the following:

"The article deals with a method for solving chemical problems which, though universally employed in the chemical engineering profession is not yet widely known in the older combustion industries. This method for solving combustion problems has been recently adopted by the American Society of Mechanical Engineers by virtue of its numerous advantages over older methods. It has been widely discussed in power plant journals, but I have seen no mention of it in the lime plant publications.

"I have made a thorough study of the last ten years' issues of Rock Products, and I have reason to believe that an article of this nature would be not only novel but also very instructive to many Rock Products readers. I have included a short review of elementary chemical theory, for I am satisfied that these principles are not very well understood by the average lime plant operator.

"As to my qualifications for writing on this subject, I have the degree of Master of Science in Chemical Engineering, having done the major portion of my graduate study in the fields of chemical and physical thermodynamics, combustion, and catalysis. I have had two years of experience as combustion engineer and chief chemist in a 2200-hp. plant. For the last several months, I have been doing special investigation work at the Galloway, Mo., lime plant of the Ash Grove Lime and Portland Cement Co. It was during this time that I became acquainted with the need of a simple method for approaching the chemical problems of the lime industry, and it was this belief that prompted the writing of this article."

For example, consider the combustion reaction in which carbon burns with oxygen to yield carbon dioxide. In the shorthand method of representing complete chemical reactions, we write:

C	+	O_2	→	CO_2
12		32		44

This equation states that one atom of carbon unites with one molecule of oxygen to produce one molecule of carbon dioxide. Since the relative weights of one atom of carbon, one molecule of oxygen, and one molecule of carbon dioxide are respectively, 12, 32, and 44, the above equation also states that 12 parts by weight of carbon unite with 32 parts by weight of oxygen to produce 44 parts by weight of carbon dioxide. The weight relationships are relative, and so it makes no difference what units of weight are used, whether it be pounds, ounces, grams, or tons, just so long as consistent units are used throughout. It may be seen from this illustration that by describing the reaction quantitatively in terms of atoms and molecules, we avoid the cumbersome and complicated method of dealing with odd weights of materials, and we use in its place a simple and convenient system based only on small whole numbers.

Why then, can we not combine the ideas of weight and molecular unity and think of a pound atom of carbon, a gram molecule of oxygen, or a ton molecular weight of lime? Thus, in speaking of a pound atom or a pound molecule of any material, we would mean the number of pounds of that material which is numerically equal to the relative weight of the reacting unit, whether it be a molecule or an atom. In describing the fundamental lime-

* It is suggested that those who are not familiar with the elements of chemistry and chemical nomenclature read the following appendix of fundamental chemical theory.

According to Atomic Theory, all elementary forms of matter are composed of very small unit quantities called atoms. All the atoms of a given element have the same size and weight, but atoms of different elements have different sizes and weights. Atoms of the same and different elements unite with each other to form unit quantities of compound substances called molecules. Whereas the atom is the smallest conceivable particle of any element, a molecule is composed of constituent atoms and is the smallest unit quantity of matter which can exist by itself and retain all the properties of the original substance. To indicate the composition of a unit molecule of any substance, chemists use "atomic symbols" and "molecular formulas." The formula for water, H_2O, is a brief statement that two atoms of hydrogen (H) are united with one atom of Oxygen (O) to form one molecule of water. Similarly, the formula $CaCO_3$ indicates that the calcium carbonate molecule is composed of one atom of calcium (Ca), one atom of carbon (C), and three atoms of oxygen. Atoms of gases rarely exist alone, but are generally combined with one another in molecules of the pure substance. Atmospheric nitrogen, for example, occurs in molecules composed of two atoms of nitrogen; its formula is written N_2. The relative weights of all known atoms may be found in any standard table of atomic weights, and the molecular weight of any substance may be obtained by adding together the weights of all its constituent atoms. Thus, since the atomic weight of carbon is 12, and that of hydrogen 1, the molecular weight of methane (CH_4) is 16.

A "chemical equation" is a convenient method for describing the characteristics of a chemical reaction. The molecular formulas of all the reacting substances are written on one side of an "equals" mark, and the molecular formulas of all products of the reaction are written on the other side. A chemical equation is correct only when "balanced," i.e., when the total number of atoms of each reacting element on the left hand side of the equation exactly equals the number of atoms of the same element on the right hand side of the equation.

stone decomposition reaction, we could say simply, "One ton molecule of limestone decomposes to give one ton molecule of lime." We have thus described the reaction completely both chemically and quantitatively. Without the molal system, we would have to say, "One ton of limestone decomposes to give 0.56 tons or 1120 pounds of lime," and this cumbersome factor of 1:1120 would have to be carried through all subsequent calculations. This single factor would not be so bad if it were not accompanied by a large number of other factors which represent reactions occurring simultaneously with the calcining reaction. These factors, growing in number and complexity as the calculations advance, are enough to confuse and exasperate even the best of lime-plant engineers.

While solids are generally measured by weighing and their analyses expressed in per cent by weight, gases are generally measured by volume and their compositions expressed in per cent by volume. Thus, in a reaction involving both solid and gaseous materials, such as a combustion reaction between a solid fuel and air and yielding both solid and gaseous reaction products, it is necessary to deal with compositions expressed in two different ways. Whether we select the volume per cent or the weight per cent as the common basis, we must go through the tedious process of conversion from one basis to the other. And even when this has been done, more calculations are necessary before these values can be used conveniently in quantitative chemical calculations. The molal system, however, furnishes a simple and convenient way to express all compositions on a common basis, a basis which immediately lends itself perfectly to any combustion or chemical calculations which may follow. It combines the advantages of simplicity, both mathematical and chemical, with the speed and accuracy so necessary in modern engineering practice.

Some Specific Examples

A series of specific examples will best serve to explain and demonstrate the molal method of calculation as applied to the types of problems most characteristic of the lime-burning process. The examples given will deal primarily with lime kiln combustion reactions, for fuel costs and fuel wastes are of paramount importance in any lime plant economy. The methods discussed, however, may well be applied to any type of chemical calculation.

Example 1:

What are the theoretical air requirements for the perfect combustion of a natural gas having the following composition: methane (CH_4) 77.7%, ethane (C_2H_6) 14.6%, carbon dioxide (CO_2) 0.4%, oxygen (O_2) 0.2%, and nitrogen (N_2) 7.1% by volume?

A well-known physical principle states that a molecule of any gas occupies the same volume of space that a molecule of any other gas would occupy under the same conditions of temperature and pressure. From this, it follows that a gas analysis on the volume-per cent basis is identical to the analysis of the same gas reported on the mol-per cent basis. The above analysis therefore gives the mols of each constituent gas present in a given quantity of fuel gas.

For convenience, let us assume that we have 100-pound mols of fuel gas. The molal composition of this fuel is:

Constituent	% by vol.	lb. mols gas	lb. atoms C	lb. mols H_2	lb. mols O_2	lb. mols N_2
CH_4	77.7	77.7	77.7	155.4		
C_2H_6	14.6	14.6	29.2	43.8		
CO_2	.4	.4	.4		.4	
O_2	.2	.2			.2	
N_2	7.1	7.1				7.1
Total	100.0	100.0	107.3	199.2	.6	7.1

The balanced equations representing the combustion of these constituents with oxygen are as follows:

$$C + O_2 \rightarrow CO_2$$
$$H_2 + \tfrac{1}{2}O_2 \rightarrow H_2O$$

Obviously, if one atom of carbon requires one mol of oxygen, 107.3 atoms of carbon will require 107.3 mols of oxygen. Likewise, if one mol of hydrogen requires one-half a mol of oxygen, 199.2 mols of hydrogen will require 99.6 mols of oxygen. The total mols of oxygen required would be 206.9, but 0.6 mols of oxygen are already present in the fuel, making the actual oxygen required equal to 206.3 pound mols of oxygen per 100-pound mols of fuel.

The composition of air may be taken as 21% oxygen and 79% nitrogen by volume. This means that for every 21 mols of oxygen there are 79 mols of nitrogen. To obtain one mol of oxygen for combustion, we must burn 4.76 mols of air and carry along as an inert diluent 3.76 mols of nitrogen. If 100 mols of fuel require 206.3 mols of oxygen, and each mol of oxygen represents 4.76 mols of air, the total air required for perfect combustion is the product of $(4.76)\times(206.3)$ or approximately 982 pound mols of air per 100-pound mols of fuel.

Since, as stated above, a mol of gas is also a unit of volume, we may express our result directly as cubic feet, provided we specify the temperature and pressure at which each gas is measured. Our result would then read: 100 cu. ft. of the given natural gas require for perfect combustion 982 cu. ft. of air, both gases being measured under identical conditions of temperature and pressure.

Example 2:

If a lime kiln fired with the above gas will produce 0.3 pounds of calcium oxide (CaO) per cubic foot of fuel gas (measured at 32 deg. F and 760 mm. of pressure) and the average carbon dioxide content of the dry exhaust gases is given by a continuous CO_2 recorder to be 25%, what percentage of excess air is being used for combustion?

It is known that one pound mol of any gas will occupy approximately 359 cu. ft. of volume at 32 deg. F and 760 mm. of pressure. One pound mol of fuel will therefore calcine $(0.3)\times(359)$ or 107.7 pounds of lime. Since the molecular weight of calcium oxide is 56, the pound mols of lime produced per 100 mols of fuel is $(107.7)\div(56)$ or 1.923.

The limestone decomposition reaction is given by the equation:

$$CaCO_3 + \text{heat} \rightarrow CAO + CO_2,$$

and if one mol of carbon dioxide is formed with each mol of calcium oxide, it needs must follow that 1.923 mols of carbon dioxide are liberated in the kiln and added to the exhaust gases for each mol of fuel gas burned. In the previous example, it was shown that one mol of fuel liberated, upon combustion, 1.073 mols of carbon dioxide. The total amount of carbon dioxide escaping from the kiln is therefore 2.996 pound mols per mol of fuel burned.

The continuous CO_2 recorder gives this 2.996 mols of carbon dioxide to be 25% of the kiln exhaust. The total volume of kiln gas is consequently $(2.996)\div(0.25)$ or 11.984 pound mols per 100 mols of fuel gas consumed. This 11.984 mols of kiln gas will be composed of the 2.996 mols of carbon dioxide plus the excess oxygen and all the nitrogen which has entered the kiln with the fuel and with the air. Again from *Example 1*, we see that 2.063 mols of oxygen bring into the kiln $(2.063)\times(3.76)$ or 7.757 pound mols of nitrogen. The fuel itself contains 0.071 mols of nitrogen, making the total nitrogen from the burned fuel and its combustion air equal to 7.828 pound mols. Thus we have accounted for $(7.828)+(2.996)$ or 10.824 mols of the total 11.984 mols. The remaining 1.160 mols of kiln gas must therefore be the excess air. Since, from *Example 1*, the theoretical air required for perfect combustion is 9.82 mols per mol of fuel, the percentage of excess air is $(1.16)\div(9.82)$ or 11.8 per cent.

Example 3:

The following information is available from the plant records of an externally coal-fired shaft lime kiln:

Coal analysis	per cent
Carbon	67.08
Hydrogen	5.46
Sulfur	0.75
Nitrogen	1.41
Oxygen	17.13
Ash	8.17
Total	100.0

Limestone analysis	per cent
Moisture	1.2
Calcium carbonate	83.7
Magnesium carbonate	8.2
Inert oxides, etc.	6.9
Total	100.0

Cinder analysis	per cent
Carbon	8.3
Ash	91.7
Total	100.0

Lime analysis	per cent
Loss on ignition (CO_2)	0.0

Pounds of lime produced per pound of coal fired 3.7
Stack-gas analysis (from recording CO_2 meter) 27%

What amount of excess air is this kiln using for combustion?

(1) In the solution of this problem, it is first necessary to reduce all participants in the reaction down to a common molal basis. This is done, in all cases, simply by dividing the weight of each substance by its corresponding molecular weight.

In 100 pounds of coal:						
Constituent	% by wt.	lb. atoms C	lb. mols H_2	lb. mols O_2	lb. mols N_2	lb. atoms S
C	67.08	5.58				
H	5.46		2.73			
O	17.13			0.54		
N	1.41				0.05	
S	0.75					0.02
Ash	8.17					
Total	100.00	5.58	2.73	0.54	0.05	0.02

Note: The amounts of sulfur and nitrogen are so small that they may be ignored henceforth without greatly affecting the accuracy of the following calculations.

(2) In 100 pounds of cinder:			
Constituent	percent	lb. atoms C	Lbs. Ash
Carbon	8.3	0.69	
Ash	91.7		91.7
Total	100.0	0.69	91.7

(3) In 100 pounds of limestone:				
Constituent	per cent by wt.	lb. mols CaO	lb. mols MgO	lb. mols CO_2
Moisture	1.2			
$CaCO_3$	83.7	0.837		0.837
$MgCO_3$	8.2		0.097	0.097
Inert, etc.	6.9			
Total	100.0	0.837	0.097	0.934

Note: We should remember that the number of mols of calcium and magnesium oxides formed in the process is numerically equal to the number of mols of carbon dioxide liberated as the limestone burns.

In the calcining process, both carbon dioxide and water vapor are expelled from the limestone. The weight of material lost by the stone is 1.2 pounds of water and (0.934) × (44) or 41.1 pounds of carbon dioxide, a total of 42.3 pounds. The actual yield of the kiln is therefore 57.7 pounds of lime per 100 pounds of limestone consumed.

(4) Let us assume that 100 pounds of coal are fired into the furnace. Of this 100 pounds of material, 8.17 pounds of ash will remain in the ash pit as clinker. This clinker will also carry with it enough carbon to constitute 8.3% of the total material which falls through the fire grates. As has been shown in (2) above, every 91.7 pounds of ash is accompanied by 0.69 pound atoms of carbon. To find the total waste of carbon in the ash, we simply divide 8.17 by 91.7 and then multiply by 0.69. This gives approximately 0.06 pound atoms of carbon lost through the grates for every 100 pounds of coal fired.

(5) Subtracting the 0.06 pound atoms of carbon from the 5.58 pound atoms fired into the furnace, we have a total of 5.52 pound atoms of carbon actually burned per 100 pounds of coal fired. This carbon, by the reasons set forth in *Example 1*, requires for combustion, 5.52 pound mols of oxygen. The 2.73 pound mols of hydrogen contained in 100 pounds of coal require for combustion, 1.37 pound mols of oxygen. The total oxygen required is 6.89 pound mols. Subtracting the 0.54 mols of oxygen already present in the fuel, we have remaining 6.35 mols as the actual oxygen required.

Since, as in *Example 1*, one mol of atmospheric oxygen represents 4.76 mols of air, or 3.76 mols of nitrogen, the total amount of nitrogen entering the kiln with the above 6.35 mols of oxygen will be, (6.35) × (3.76) or 23.9 pound mols, and the total air thus admitted will be (6.35) + (23.9) or 30.25 pound mols. This is the theoretical air required for perfect combustion of 100 pounds of coal fired.

(6) From the given information, we know that 370 pounds of lime are produced for every 100 pounds of coal fired. From (3), we know that 100 pounds of limestone are consumed per 57.7 pounds of lime produced. Therefore, if 370 pounds are produced, the weight of limestone consumed will be (370) × (100/57.7) or 641 pounds, and this will be the weight of limestone charged into the kiln for each 100 pounds of coal fired.

Each 100 pounds of limestone liberate 0.934 pound mols of carbon dioxide. The total CO_2 coming from the stone for each 100 pounds of coal fired will be (0.934) × (641/100) or 5.98 pound mols. And 5.52 pound atoms of carbon burned with the fuel will liberate 5.52 pound mols of carbon dioxide, and so the total CO_2 formed in the kiln per 100 pounds of coal fired will be 11.50 pound mols.

(7) Our calculations thus far have accounted for the following volumes of kiln gases:

Carbon dioxide from the stone	5.98 pound mols
Carbon dioxide from combustion	5.52 pound mols
Nitrogen from the combustion air	23.90 pound mols
Total	35.40 pound mols

The recording CO_2 meter gives the carbon dioxide to be 27 per cent of the kiln gas. The total volume of dry kiln gas per 100 pounds of coal fired must therefore be (11.5) ÷ (0.27) or 42.6 pound mols. This leaves a difference of 7.2 mols of kiln gas unaccounted for, and this is the volume of excess air. The percentage of excess air admitted into the kiln, reckoned on the basis of fuel actually burned, is (7.2) ÷ (30.25) or 23.8 per cent.

Adds Promotion Manager

STANDARD LIME AND STONE Co., Baltimore, Md., has appointed James Maratta, formerly eastern retail sales director of the Minneapolis-Honeywell Regulator Co. and more recently general sales manager of the General Electric's air conditioning operations in New York and New England, advertising and sales promotion manager of the Capitol Rock Wool division of the company.

Rock Wool Research

OKLAHOMA GEOLOGICAL SURVEY has found, mapped and sampled numerous deposits of limestone suitable for rock wool manufacture, according to Robert H. Dott, director. A research laboratory is being fitted out.

Slate Industry Revived

GRANVILLE, N. Y.: Press dispatches dated September 11 stated 300 workers would be re-employed in local slate quarries the following week, after several years of idleness.

Mountain of Nova Scotia Gypsum to World Markets

Victoria Gypsum Co., Ltd. Has Ideal Facilities

By R. A. McMullin,*
Project Engineer,
Boston, Mass.

NATURE has provided enough gypsum to supply every construction need of America for ages to come, but not much of it is in the eastern half of the United States. Particularly near the Atlantic seaboard one finds few deposits of gypsum of any real consequence or in any easily workable quantity convenient to the large seaboard markets, until one reaches the shores of the Atlantic itself, and then only in our neighboring Canadian Maritime Provinces of New Brunswick, Nova Scotia and particularly the far eastern Island of Cape Breton. Here, gypsum abounds in quantity and quality, and here the friendly attitude of the Canadian Government to enterprises of this kind has opened the way for gypsum production. But here gypsum is usually recovered under difficulty, and under difficulty loaded into ships for transport to the market in the eastern Atlantic States.

While a vast quantity of gypsum has already been taken out of Nova Scotia, it has been taken out under various handicaps of quarrying and underground mining and under serious problems of ship loading.

Plants located on the Bay of Fundy are largely compelled to mine below ground level, are faced by heavy expensive transport from quarry to loading docks, and, at their loading docks, are handicapped by extreme 40-ft. tidal conditions, leaving boats high and dry at the loading docks at low tide, thus permitting very short ship-loading periods. Plants now located on the northern shores of the Island of Cape Breton, on the Gulf of the St. Lawrence, are handicapped in maintaining their loading piers on the open ocean, because their shipping terminals are exposed to the never-ending destructive forces of the North Atlantic Ocean. This condition has required enormous and almost constant dredging expense.

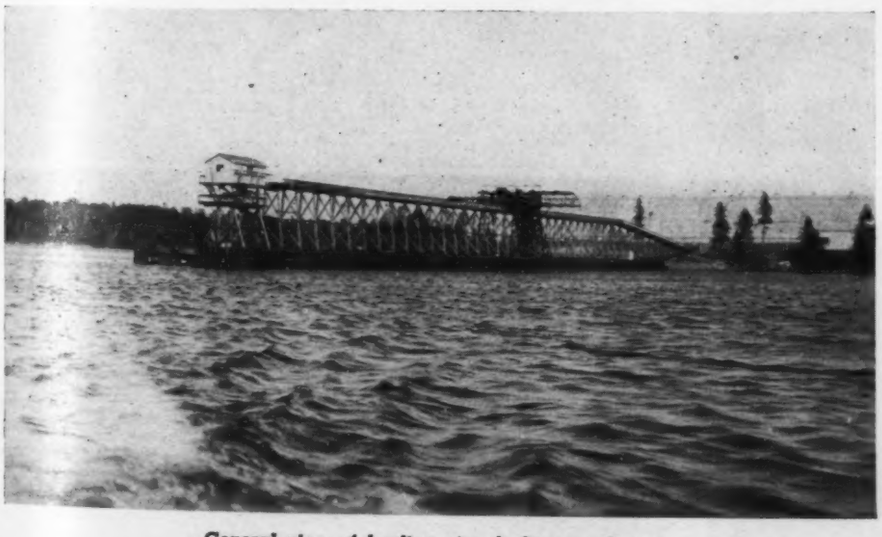
Cape Breton Deposits

The Victoria Gypsum Co., Ltd., owns very large deposits of gypsum in Cape Breton, and has just completed the best equipped raw gypsum producing plant in North America. Its property is located on St. Patrick Channel at Little Narrows, Cape Breton, which is on the Bras d'Or Lakes, a deep water arm of the sea, navigable to ocean-going ships, and extending some sixty miles inland from Sydney, Nova Scotia, where the tide at the new loading pier, rises and falls not more than 2 ft. in contrast to the great tides of the Bay of Fundy, not far distant. The Victoria Gypsum Co.'s loading pier, with 26 ft. depths of water alongside, may be approached in any kind of weather during the shipping season, making for safe ship-handling and ideal loading conditions.

The property, embracing about 800 acres, is covered practically throughout by a deep bed of gypsum with very little clay overburden, and the high faces available make it possible to mine this material by the open quarry method at a minimum excavating expense. This true gypsum deposit, all above sea level, is of the highest-grade, first quality, passing the most stringent chemical analysis requirements. It will produce a clear, white plaster; and the deposit occurs in such quantity as to insure supply to the steadily growing industry for years to come.

The annual exports of gypsum from Nova Scotia to the United States are expected to materially increase with the completion of this plant; and while it is approximately 1000 miles east of Boston and New York, the ocean freight rates as compared with those by rail on gypsum from the Southwestern or the Middle States, or even from the State of New York itself, will be favorable for eastern seaboard trade. Since this new plant is located almost one-third of the way to Europe, the English trade will also seek gypsum from this shipping point. The plant, therefore, has been designed in preparation for very large tonnage demands.

The final organization of this enterprise was culminated a year ago, after eight years of careful investigation as to the raw material deposits, the cost of production for market, the cost of transportation to market, and the market demands for the product, and with these factors once definitely determined, a plant costing nearly a million dollars,



General view of loading pier, looking southwest

* Manager, New England Branch, Stephens-Adamson Manufacturing Co.

Bringing in a roll of conveyor belt under winter handicaps

Portion of quarry face, looking west

Section of quarry looking north

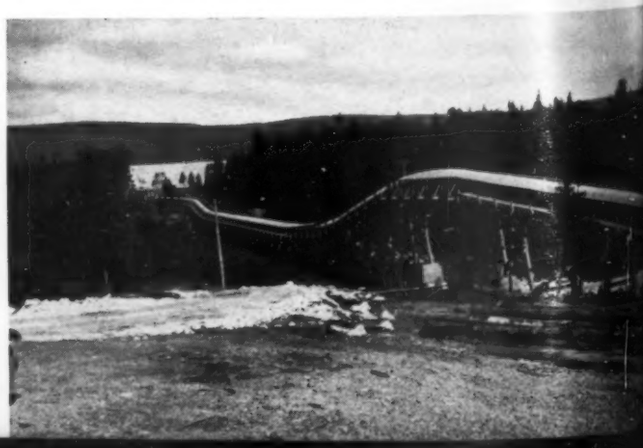
View of quarry road looking north from top of quarry head

ABOVE—Conveyor from primary crusher to vibrating screen over secondary crusher

BELOW—Trunk line belt conveyor No. 6 following contour of ground, looking south

ABOVE—View of primary and secondary crusher plant, looking south from station No. 100

BELOW—Trunk line belt conveyor No. 6, traveling north over highway



Conveyor No. 7 extending over pond to storage building; horizontal white background is storage building roof covered with snow

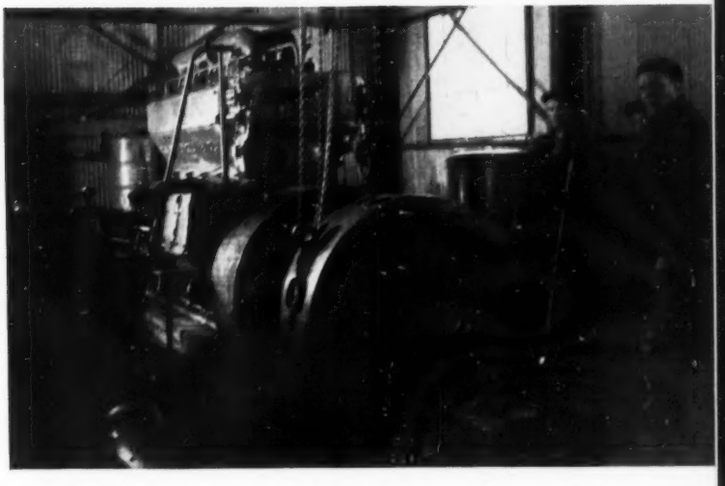
Interior view of west half of storage building

View of storage building, looking south from dock conveyor No. 12

Traveling gantry shiploader over conveyor No. 12 on dock, looking south from end of dock

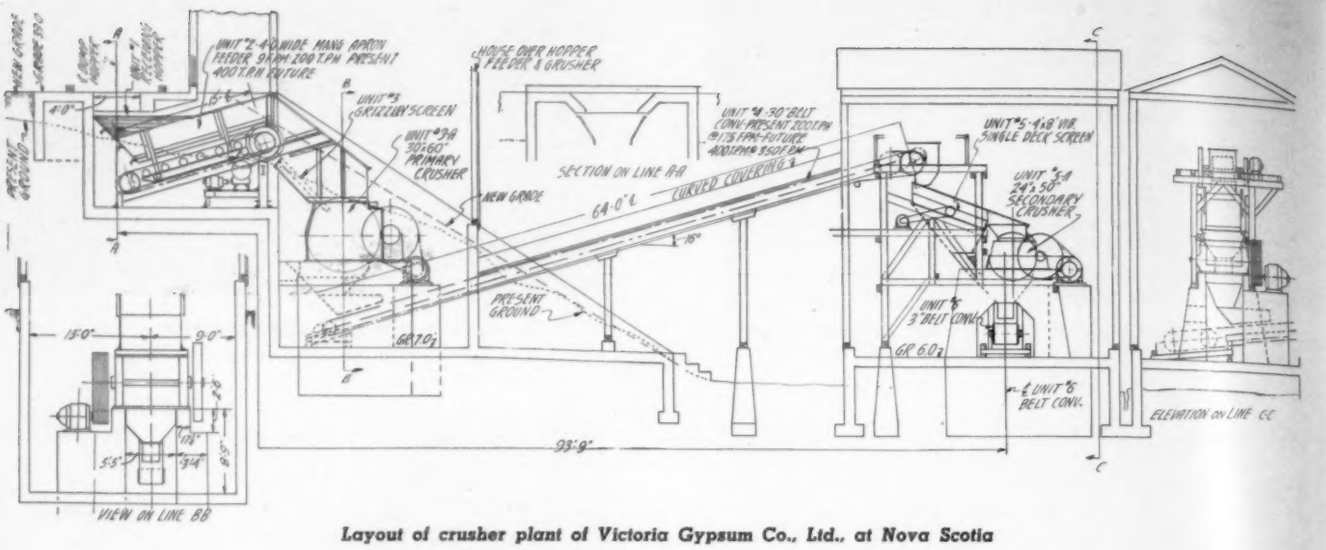
ABOVE—Power plant looking northwest from roof of main storage building

BELOW—Storage building looking northeast



ABOVE—Interior of power station showing Diesel generating set

BELOW—Delivering rock from quarry to crusher house dump hopper

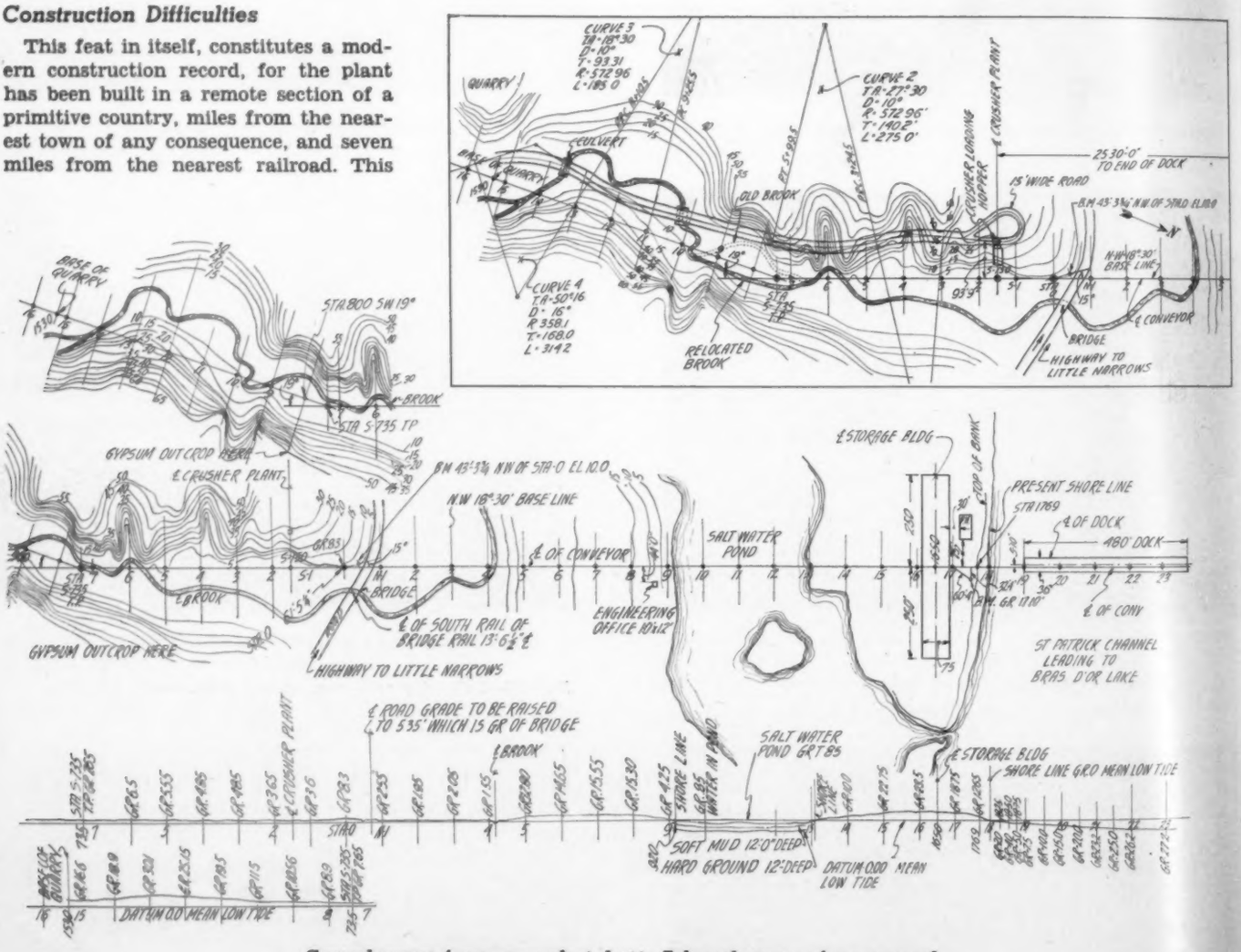


Layout of crusher plant of Victoria Gypsum Co., Ltd., at Nova Scotia

has been constructed and recently put into operation, exactly one year from the date of the start of the designing of the plant and from the time of making the original surveys for construction.

Construction Difficulties

This feat in itself, constitutes a modern construction record, for the plant has been built in a remote section of a primitive country, miles from the nearest town of any consequence, and seven miles from the nearest railroad. This required that practically all construction equipment and all material for construction be either hauled over seven miles of rough country roads, or delivered on the shore of the Lake at the plant site and brought ashore under difficulty. The plant site presented a dense forest impossible even to survey until Canadian woodsmen blazed a path sufficient for transit lines before the

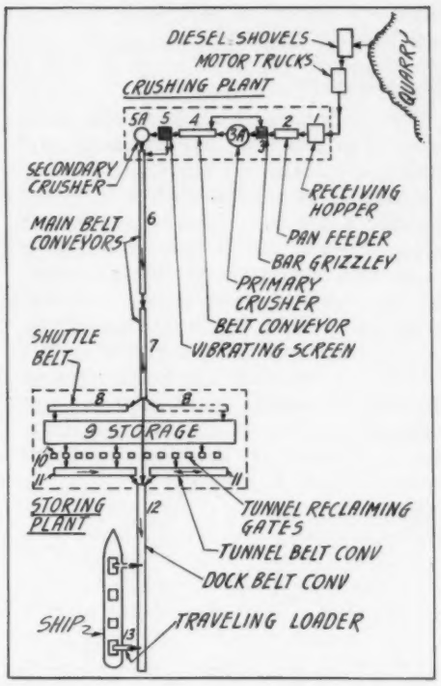


General survey for gypsum plant. Inset—Enlarged survey of quarry road

real clearing for the whole plant construction began.

While the country is presumably closed for three or four months in the winter season, construction went on during this period last winter, as is evidenced by some of the accompanying construction illustrations, because it was felt the demand for gypsum from this plant justified every possible effort to place this product, not only on the United States market, but on the European market at the earliest possible date.

The severe climatic conditions in Nova Scotia had a strong bearing upon the design of this plant, the purpose of which is to quarry and size raw gypsum rock and store it in large quantity for rapid loading of ships through the producing and shipping season, which extends over a period of nine months of the year. While the shipping season actually closes in December, so that during January, February and March, no shipments can be made, quarry operation can, if needs be, start earlier than the end of March to stock up for the opening of the succeeding shipping season.



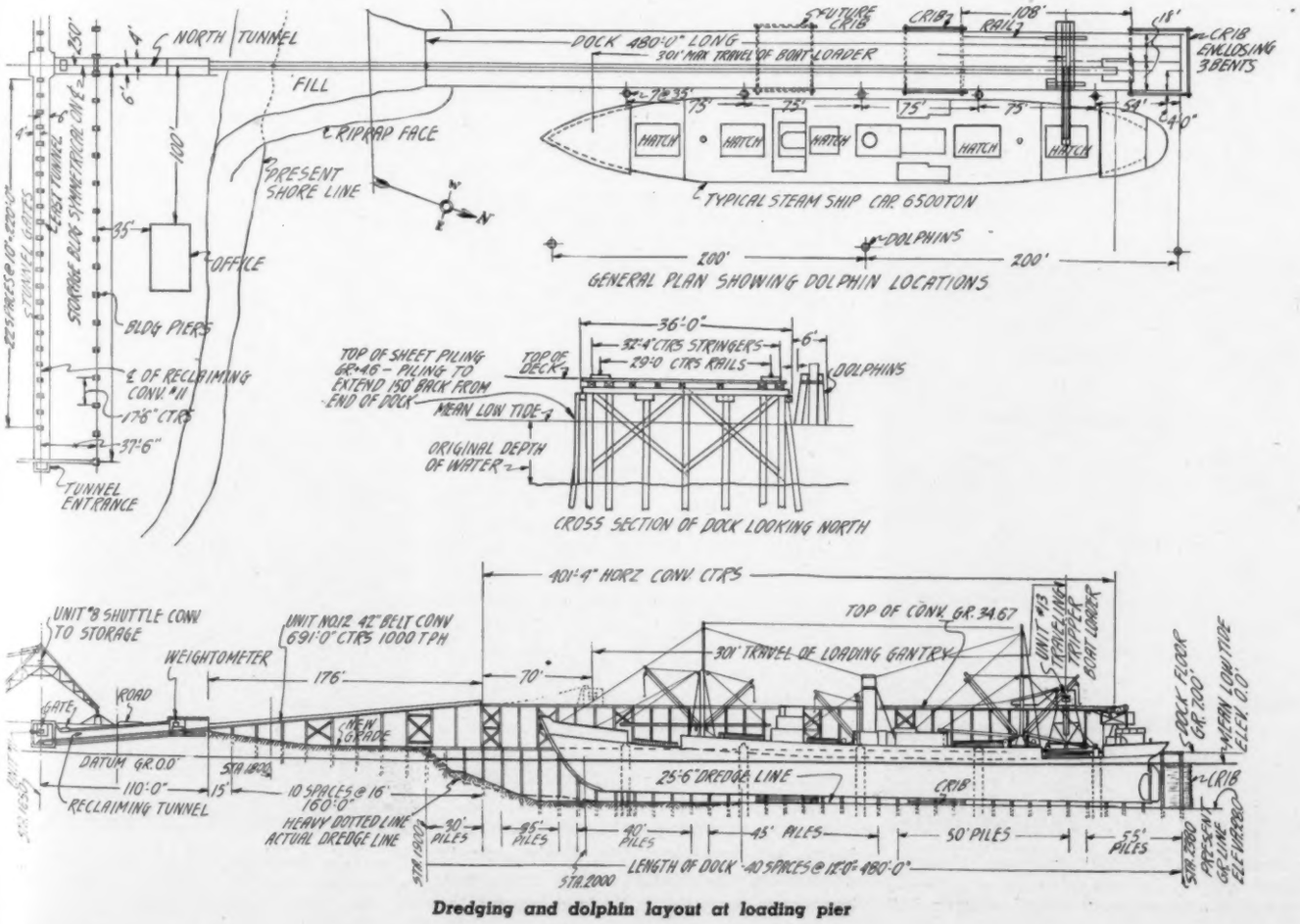
Flow sheet for gypsum handling at Cape Breton plant

Winter Storage Provided

Since provision had to be made for a large storage of the crushed gypsum rock in order to load ships at a much faster rate than the normal quarry production rate, the problem revolved largely about providing an enormous covered storage building near the loading pier into which the gypsum could be delivered at leisure and reclaimed at a rapid rate. The design of the whole plant layout, therefore, became primarily a material-handling problem, involving an equipment of elevating and conveying machinery from the quarrying and crushing process up to and including the ship-loading process, all of which was strongly influenced by the irregular contour of the property.

The gypsum deposits, some 3000 ft. back from the south shore of Bras d'Or Lake, center about a deep ravine, which gradually slopes towards the Lake. This ravine, starting at an elevation of about 100 ft. above the Lake and dipping towards it, gives a convenient natural water supply, which, as the quarry faces are worked back on either side of the ravine, has been impounded for quarry operations.

When once a center line for the entire plant set-up was established by the general survey and profile map here illustrated, it became evident that the most economical method of transporting materials from quarry to ships, was to locate the crushing plant close to the quarry so as to immediately crush and size the material and then convey the



Dredging and dolphin layout at loading pier

product the balance of the distance by means of a continuous belt conveyor system. This method has long since proved to be the most economical in material-handling problems of this kind.

Belt Conveyors 2500 Ft. Long

This set-up caused the selection of motor trucks as giving the most flexible means of bringing the rock from the quarries to the crushing plant over a relatively short distance of about 900 ft. maximum truck haul. The remaining distance of approximately 2500 ft. from the crusher plant to the end of the ship-loading pier is covered by a series of continuous belt conveyors, because these belt conveyor units could follow the irregular profile of this distance without cut or fill and with a minimum cost of supporting stuctures.

Two belt conveyors are required to carry the material from crushers to the storage building: one, 1040 ft., center lines, which is the longest belt conveyor installation in Canada, and the other, 775 ft., center lines. In traversing this distance, these units rise sufficiently high to cross a public highway, then drop down as they cross a swamp section of land, where the conveyor structures are carried on creosoted piling, then upward over a plateau, then on piling across a pond, some 400 ft. wide, and finally up a 315-ft. incline to the top of the storage building, as indicated by accompanying illustrations. It is interesting to note that from the time a piece of rock is dumped into the receiving hopper above the crushers until it is crushed and delivered in the storage building, but 12¾ minutes are required, and only 3 minutes is consumed in the travel of a piece of gypsum from storage building to ships.

Conveyor No. 7 looking back towards crusher plant from top of storage building showing curved aluminum hoods over conveyor belt

Plant Details

The flow sheet on page 57 indicates the general arrangement and scheme of operation of the plant.

Large Diesel shovels, furnished by the Harnischfeger Sales Corp., load the raw gypsum rock blasted from the quarry faces into motor trucks, which transport it a short distance to the receiving hopper at the top of the crushing plant.

The crushing plant is designed with a view to minimizing the production of unnecessary fines below the desired commercial sizes of the finished product, and therefore, was laid out in the manner shown by diagram.

From the receiving hopper at the top of the crusher plant, the rock feeds by gravity to a heavy, inclined, manganese-steel pan feeder, for uniformly regulating the flow of rock to a smooth ribbon, before passing it over a bar grizzly located above the primary crusher. The bar grizzly is provided with 4½-in. clear spaces between the bars for bypassing all material 4½ in. and under before it passes through the primary crusher. The primary crusher, a "Penn-Lehigh" series, single-roll crusher, size 30 x 60 in., reduces all material above 4½ in. and up to 30-in. cubes of rock down to 4½-in. product and under which joins the bypassed material in a hopper below the primary and passes to an inclined belt conveyor for again elevating to a vibrating screen, located over a secondary crusher. The S-A vibrating screen removes all material above 2-in. cubes, passing the tailings to a "Pennsteel" series secondary, single-roll crusher, 24x50 in., reducing the balance of the material to 2-in. cubes, and it again joins the bypassed flow below the crusher, and feeds to the main belt conveyor system. Both crushers are made by the Pennsylvania Crusher Co.

As both crushers are adjustable to different size production, by simply changing the screen surface on the vibrator, any size finished product is obtainable, according to the market demands.

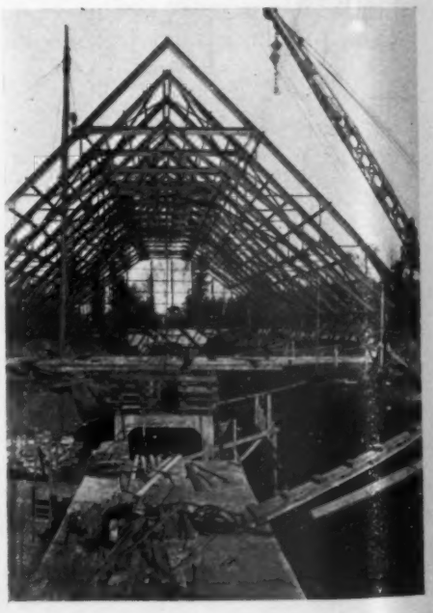
From this point, the main trunk line belt conveyor, Item No. 6, carries the material a distance of 1040 ft. to the edge of a salt water pond, there delivering to a second trunk line belt conveyor, Item No. 7, which extends across the pond, and thence up a long incline, elevating the material to the top and central point of the main storage building, which is located at right angles to the line of travel of the belt conveyor system, as illustrated in accompanying view.

At the central point, the trunk line belt conveyor, Item No. 7, delivers to a shuttle distributing belt conveyor, known as Item No. 8. This conveyor, located in the top of the storage building, is reversible in its direction of belt travel, and the entire shuttle unit may be traveled in either direction so as to distribute material to any point over the entire 500 ft. length of the storage building, making it easily possible to store different grades and sizes of gypsum in different sections of the building, as desired. It should also be noted that the layout provides for bypassing the storage building so that crushed gypsum may be conveyed direct from crushers to ships, if desired.

Storage Building

The storage building itself, fabricated by J. W. Cumming Manufacturing Co., New Glasgow, is of an economical and unique design. It provides for a storage capacity of 29,000 tons of crushed gypsum, with a minimum cost of structure, consisting primarily of a series of main A-frame trusses, as illustrated, spaced 17 ft. 6 in., center lines, with a clear span of 75 ft. carried on heavy concrete piers, the frame being covered with copper-bearing, corrugated metal sheeting to protect the gypsum from the weather. This building is 500 ft. long and is provided with ample ventilators the entire length of the roof for cooling in the summer, and is provided with windows at either end and large doors for access, of sufficient size to admit the Diesel shovels, if required.

A large concrete tunnel, as illustrated, is located in the center of the storage building, extending the full 500 ft. length. Reclaiming gates with loading chutes are placed every 10 ft. below the roof of the tunnel for gravity reclaiming of finished raw gypsum from storage to either one of the two tunnel belt



Conveyor reclaiming tunnel under west hall of storage building, looking towards tunnel junction house

conveyors, known as Item No. 11, each of which conveys towards the center of the building, and there delivers to a dock distributing belt conveyor, known as Item No. 12.

This arrangement makes it possible to run one or the other of the two reclaiming belts, or both of them if needs be, to blend the quality and size of finished gypsum to meet various market requirements.

Transportation to Wharf

The dock distributing belt conveyor is provided with a Merrick conveyor Weightometer, for automatically and continuously weighing of all material going to ships. This conveyor travels from below the center point of storage building tunnel on a slight incline for a distance of 287 ft. until it reaches the shore end of the ship-loading pier, and thence horizontally 404 ft., passing through a traveling tripper for delivering its load at any point along the pier to the cross shuttle conveyor for loading the ships.

As the trunk line belt conveyor on the pier is some 28 ft. above the pier floor, the cross shuttle belt conveyor is high enough above the dock to meet various ship-loading requirements. The cross shuttle conveyor is carried in a structural steel traveling gantry, which spans the No. 12 conveyor structures and rides on rails on either side of the dock, so arranged as to travel over a distance of 300 ft. The loading shuttle may be stopped at any point along the line for delivering to any one of the holds of the ship, and the control of this unit is handled by one operator located in operator's house in the top of the gantry structure, sufficiently high above the pier to observe and control the operation of the entire ship-loading system.

Ship-Loading Shuttle

By this design, ships are brought *along side* of the pier and made fast to it during the entire ship-loading process, instead of being placed at the *end* of the pier where it would be necessary to move the ships themselves forward and backwards as the load is distributed in their various hatches in the process of trimming and loading of ships. This feature is a marked improvement over any other loading facilities now in use in Nova Scotia, and since this traveling gantry shuttle boat-loader, though weighing 77,000 lb., may be moved from hatch to hatch in a fraction of the time that would be required to move the ship, the complete trimming and loading of a ship is greatly expedited over any other method, and requires but one operator and no attention on the part of the ship's crew.

The shuttle belt ship-loader is adjustable to various widths of ship hatches and is arranged to travel from one hatch to the other without interfering with ship rigging, by raising the aluminum telescopic loading spout, and collapsing the shuttle, giving a clear space along side of the dock for the handling of ships of any description.

The accompanying diagram shows the general outline of a 6500-ton ship alongside of the loading pier, from which it is seen that the pier itself is 36 ft. wide and 480 ft. long and provides for a 26 ft. depth of water its entire length to accommodate the drafts of 6000 to 8000-ton ships, which are the maximum draft expected at this port.

Designed Capacities

The present plant is designed to crush and store 2-in. and under gypsum rock at a uniform rate of 200 tons per hour with all driving connections, size of headshaft, gears, etc., of sufficient strength to permit of a future increase, to an ultimate future uniform rate of storing capacity of 400 tons per hour.

The motors for driving the trunk line belt conveyors to storage, items No. 7 and 8, will be changed in the future and doubled in size when the plant grows to 400 tons per hour capacity, but the motors driving the pan feeder, primary crusher, vibrating screen and secondary crusher are furnished of sufficient size at the present time for the ultimate capacity rate of 400 tons per hour.

When future increased rates of capacity are required in crushing and storing, additional shovel equipment and truck equipment will be supplied for the quarry.

The reclaiming conveyors and ship-loading equipment are capable of loading at a maximum uniform rate of 1000 tons per hour, and with flood lights provided along the dock for night operation, this high rate of capacity is such that a ship arriving at the end of the day, may be loaded the same night and be ready to sail at daylight.

The primary crusher is capable of receiving gypsum rock as 30-in. maximum cubes and reducing to a 4½-in product and under, while the secondary crusher will handle the 4½-in. product from the primary and further reduce it to 2-in. cubes.

All belt conveyors carrying to storage are 30 in. wide, running 175 ft. per min. for the present capacity, and will be increased to 350 ft. per min. when the future capacity is desired.

Equipment Details

All belt conveyors carrying from the storage for ship loading are 42 in. wide and operate at a speed of 450 ft. per min., the conveyor belts being furnished by the Goodyear Tire and Rubber Co. All the belt conveyors are covered with curved hoods of corrugated aluminum to protect them from the weather.

All belt conveyors are supplied with Stephens-Adamson Manufacturing Co.'s Pacific type, Style No. 234, 3-pulley, troughing carriers, the rolls being 6 in. diameter, mounted on low friction roller bearings.

The crushing and conveying equipment for this plant is driven by means of individual motors, the size of the various motors and the total power requirements being indicated in the accompanying table.

Since there was no source of electric power in this section of the country, a study of the power requirements from various angles of fuel supply, climatic conditions, etc., resulted in the selection of Diesel generating units, to provide power for the various motors of the crushing and conveying system and for artificially lighting the plant.

The power station equipment was shipped to the plant from England, and consists of a 250-hp. Ruston 5-cylinder, 4-cycle Diesel unit running 400 r.p.m., which was supplied with alternator, compressor, pumps, transformers and all electrical appurtenances, by Wm. Stairs, Son & Morrow, Ltd., Halifax. This equipment was received by water, after the dock was completed and unloaded from ship to dock for placement in the power station, behind which are located large tanks for the fuel oil supply, which is delivered by water as needed.

The lighting circuits are fed from the main lines when the plant is operating, or from an auxiliary Diesel lighting set in the power plant when the big generator is off the line. All motors for the crushing and conveying units together with interlocking control systems, etc., were supplied by the Canadian General Electric Co.

The supports for all the conveyor structures are largely of timber construction, as it was felt a minimum amount of structural steel should be used because of high maintenance cost due to atmospheric conditions in this mid-ocean country. The conveyor structures, therefore, are all of long-leaf yellow pine, which was imported into the country as no local timber of durable quantity and strength was available.

The loading pier itself is of wood pile construction, creosoted piles being necessary because of the presence of destructive teredos in Nova Scotia waters. The dock superstructure is of the highest grade long-leaf yellow pine and was shipped to the job by boat from Boston supply yards.

All concrete and masonry work for the plant, together with the construction of the pier, was handled by the MacMillan Construction and Lumber

TABLE OF POWER REQUIREMENTS OF THE VICTORIA GYPSUM CO. PLANT

CRUSHING AND STORING:

Item	Description	Present requirements Capacity	Net hp.	Motor size	Future requirements Capacity	Net hp.	Motor size
No. 2	Pan feeder	200	3	7½	400	5	7½
No. 2-A	Primary crusher	200	50	100	400	100	100
No. 4	Belt to screen	200	6.6	7½	400	13	15
No. 5	Vibrating screen	200	3	5	400	3	5
No. 5-A	Secondary crusher	100	35	75	200	75	75
No. 6	Trunk line to pond	200	19	20	400	38	50
No. 7	Trunk line to storage	200	24	25	400	48	50
No. 8	Shuttle over storage	200	4.7	7½	400	9½	15
	Sub total		145.3	247.5		291.5	317.5

RECLAIMING TO SHIPS

Item	Description	Present requirements Capacity	Net hp.	Motor size	Future requirements Capacity	Net hp.	Motor size
No. 11	Reclaiming tunnel belt (2)	1000	24	25	1000	24	25
No. 12	Dock distributing belt	1000	96	100	1000	96	100
No. 13	Shuttle boat loader						
	(a) Shuttle belt	1000	7.3	10	1000	7.3	10
	(b) Shuttle belt in motion		1.5	3		1.5	3
	(c) Gantry travel		7	10		7	10
	Sub total		135.8	148.0		135.8	148.0
	Grand total		281.1	395.5		427.3	465.5

TABLE OF SUPPLIERS OF PRINCIPAL EQUIPMENT

Operation	Item	Equipment	Supplied by
Quarrying	A	Core drills, jack hammers, compressors, etc.	Wm. Stairs, Son & Morrow
Digging	B	(2) 1¼-yd. Diesel shovels	Harnischfeger Corp.
Hauling	C	Motor trucks	Ford & Maple Leaf
Crushing	No. 1	Receiving hopper	Stephens-Adamson Manufacturing Co.
	No. 2	Pan Feeder	Stephens-Adamson Manufacturing Co.
	No. 3	Bar grizzly over primary	Stephens-Adamson Manufacturing Co.
	No. 3-A	Primary crusher	Pennsylvania Crusher Co.
	No. 4	Belt conveyor to screen	Stephens-Adamson Manufacturing Co.
	No. 5	Vibrating screens	Stephens-Adamson Manufacturing Co.
	No. 5-A	Secondary crusher	Pennsylvania Crusher Co.
Storing	No. 6	Belt conveyor to pond	Stephens-Adamson Manufacturing Co.
	No. 7	Belt conveyor to storage building	Stephens-Adamson Manufacturing Co.
	No. 8	Shuttle belt in storage building	Stephens-Adamson Manufacturing Co.
	No. 9	Storage building	J. W. Cumming Manufacturing Co.
Reclaiming to ships	No. 10	Tunnel loading gates	Stephens-Adamson Manufacturing Co.
	No. 11	(2) Tunnel belt conveyors	Stephens-Adamson Manufacturing Co.
	No. 12	Belt conveyor to dock	Stephens-Adamson Manufacturing Co.
	No. 13	Shuttle gantry boat loader	Stephens-Adamson Manufacturing Co.
	No. 14	Dock	A. S. MacMillan Construction Co.
Power	No. 15	Diesel power plant equipment	Wm. Stairs, Son & Morrow

NOTE: The auxiliary structures such as the crusher buildings, power plant building, fuel oil storage, repair and storehouse, garage and office building, were handled by the construction forces of the Victoria Gypsum Co., Ltd., and under sub-contracts with local contractors.

Co., Halifax, and the conveying machinery equipment, structural steel buildings and electrical apparatus was purchased from Canadian sources of supply. The Stephens-Adamson Manufacturing Co., Belleville, Ont., developed the details of the various structures supporting the conveying machinery, all of which was fabricated in the Canadian factory.

The accompanying table lists the names of the suppliers of the principal parts of the equipment going to make up the entire plant, and the capital invested in this plant and property came largely from Nova Scotia and the United States.

Because the entire design of the plant is such as to require a minimum amount of power and labor, which tends to make for low production costs, and because of the strong financial position of the company, Nova Scotia will unquestionably benefit by the increased exportation of gypsum, through this enterprise.

Personnel

R. W. Green, New York City, is president of the Victoria Gypsum Co.; Norman S. MacMillan is the treasurer; and the general manager in charge at Little Narrows is Edwin F. Burnham, long experienced in industrial chemical enterprises. C. R. Fancy, with many years of experience with gypsum production in Canada and Nova Scotia, is production manager.

The plant was designed by R. A. McMullin, manager of the New England branch of the Stephens-Adamson Manufacturing Co., who acted as project engineer in charge of the plant construction.

Increases Holdings—To Expand

NATIONAL GYPSUM Co., Buffalo, N. Y., has purchased 326 acres of land containing gypsum deposits, at Fort Dodge, Iowa, from the Louis E. Armstrong estate and from the Plymouth Clay Products Co., and from the Breen family, for a total of $85,000. It is reported locally that the National Gypsum Co. will increase its present manufacturing facilities at Fort Dodge by construction of a large wall-board plant.

To Produce Gypsum

ROBERT DETTON, Leadore, Idaho, has taken a contract to supply gypsum rock for the Idaho Portland Cement Co., Inkom, Idaho, from a deposit he has opened 18 miles southeast of Leadore.

New Service Department

UNITED STATES GYPSUM Co., Chicago, Ill., has recently established a department of agricultural and engineering service under the direction of E. B. Johnson, formerly manager of the company's contracting division and for several years active in the Public Works Administration in Washington. While it is the purpose of the new department to co-operate with architects and engineers towards the most efficient construction of all kinds of buildings, emphasis will be placed on low cost housing with special reference to use of the company's materials.

The announcement states that for many years its laboratories have been working on the problem of economical construction of small houses, working from the point of view that the wood frame type offers the best opportunity for low cost construction.

The company's department of architectural and engineering service will consist of a corps of men located in leading cities where their services will be available to architects and engineers. The principal office in Chicago will act as clearing house for information and will correlate field and laboratory developments.

The principal objective with respect to low cost houses is to add to the wood frame house needed qualities of fire protection and insulation while retaining its flexibility of design and economy of construction. This involves sheathing the wood frame with fireproof material, providing a fireproof plaster base and filling the walls with a fireproof insulation. Such products now are made from gypsum and related materials, the company's announcement states.

Charters Three Ships

ATLANTIC GYPSUM PRODUCTS Co., Portsmouth, N. H., now owned by the National Gypsum Co., Buffalo, N. Y., has three steamships under charter, *Pluto, Karet* and *Evviva,* for carrying rock cargoes from the company's mines at Walton, Cheticamp and Dingwall, Nova Scotia, to Portsmouth. For a while some of the shipments will be landed in New York for the plant there.

Truck Fire Explodes Dynamite

NATURAL ROCK ASPHALT Co., Natural Rock, Ky., lost a motor truck load of 120 cases of dynamite on August 25, when the truck caught fire on the Elizabethtown-Leitchfield highway and the dynamite exploded. The driver and three guest passengers fled in time to avoid injury. A large hole was made in the road and telephone and power-wire poles were knocked down.

HOW TO INSTALL DUST CONTROL EXHAUST PIPING

By C. A. Snyder*

HOODS should be constructed according to needs of the particular application. The dust-creating process should be enclosed as fully as possible without unduly interfering with operations.

Hoods must be designed to take advantage of the force and direction of the dust particles leaving the operation creating the hazard. It must be remembered that air velocities in front of an exhaust hood drop approximately inversely with the square of the distance from the opening. The most efficient dust collector is but half of a dust control installation, and improper hood designs can render the entire installation useless from an efficiency standpoint.

Hoods should be free from sharp edges and reinforced if necessary. Hinged sections are necessary for quick access for replacements, as in grinding wheel installations.

Piping should be run in a direct line to the dust control system if possible, but should not interfere with cranes, trucks, etc., and should be accessible for inspection and cleaning or repairs. Where abrasive wear is encountered, it is eventually cheaper to install heavy pipe with flanged bolted joints.

Changes in pipe sizes should be made with a gradual taper of 5-in. length to every inch in diameter, preferably keeping the bottom of the pipe straight its entire length. Branch pipes should enter the main near the large end of the taper preferably on the side or on the top of the pipe. The branch should enter at an angle of 30 to 45 deg. with the axis of the main. Except in special cases, the area of the main pipe at any point should equal the sum of the area of all branch pipes behind the point. Pipes should be amply supported and cleanouts with tight covers should be installed at intervals on horizontal runs, and at bends, dead ends, etc., where dust is most apt to settle.

Pipes should be kept free of obstructions, such as screens, etc., and branches should not project into the main. Joints should lap in direction of flow.

Elbows should be well formed, seven sections preferable. The centerline radius should be twice the pipe diameter where possible, or a throat radius of 1½ diameter. Elbows should be constructed of material two gages heavier than corresponding sizes of straight pipe.

Blast gates, for balancing the system, should be located near the junction with the main line if accessible. Means should be provided for fastening the gate slide in the desired position.

It is recommended that the following gages be used:

4 to 12 in. diameter, No. 20 gage.
12 to 32 in. diameter, No. 18 gage.
32 in. diameter or over, No. 16 gage.

Joints should be riveted and soldered or double lock seam.

Note: Many states have specific codes relative to piping specifications, hood design, branch pipe sizes, velocities or static pressure required. It is well to obtain copies of these codes for further information on this subject.

* Dust Control Engineer, The American Foundry Equipment Co., Mishawaka, Ind.

Volcanic Dust!

PNEUMONOULTRAMICROSCOPICSILICOVOLCANOKONIOSIS, a new word, is the name of a special disease caused by inhaling siliceous volcanic dust.

Toll of Inexperience

WPA-OPERATED QUARRIES have been the cause of many fatal accidents, but usually these are small roadside operations, inadequately equipped for safe operation by any one. In St. Louis, Mo., however, the WPA took over the operation of some quarries which had long been operated by commercial producers, one of these, the quarry of the Big Bend Quarry Co. This is a deep pit operation, which probably had been worked for many years with few if any fatal accidents.

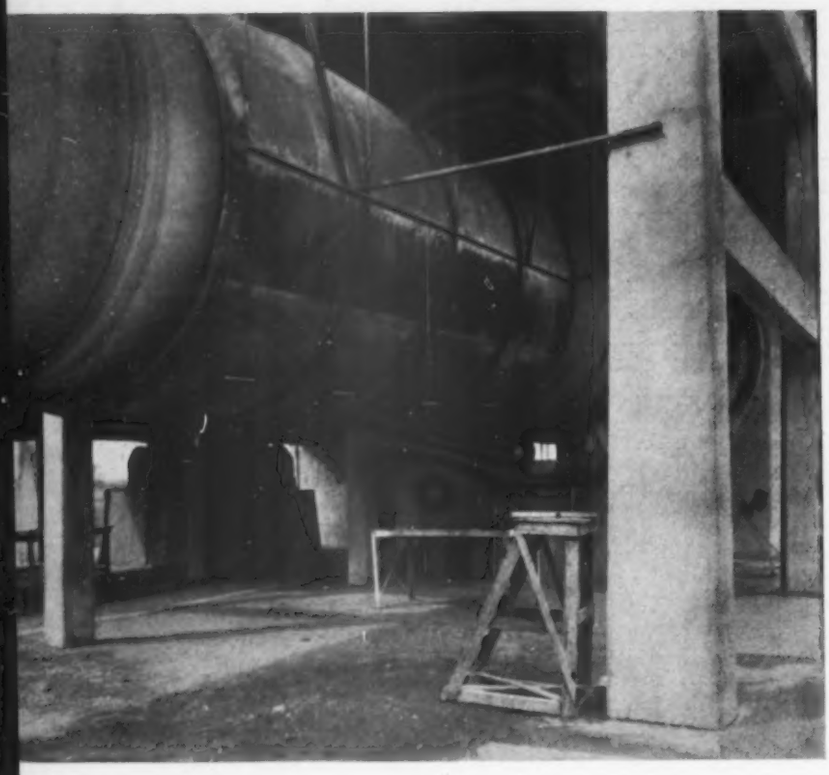
Due either to inexperienced workmen, or the general breakdown of morale, inseparable from a WPA job, one workman was killed and another seriously injured on August 27.

The quarry is about 250 ft. deep and the men were working at the bottom. One version of the accident was that three tons of rock in a hoist box fell on them when the hoist cable broke while the rocks were half way up. Another, given out by a WPA officer, was that the brake on the hoist slipped, and was applied again in time to prevent the box of rocks falling all the way, but one fell out and struck the men.

New Producer

WATERTOWN COAL-SAND-AND-GRAVEL Co., Watertown, Wis., has been established to produce and deal in sand and gravel. C. L. Curtis is manager.

Texas Cement Plants Add Latest Improvements



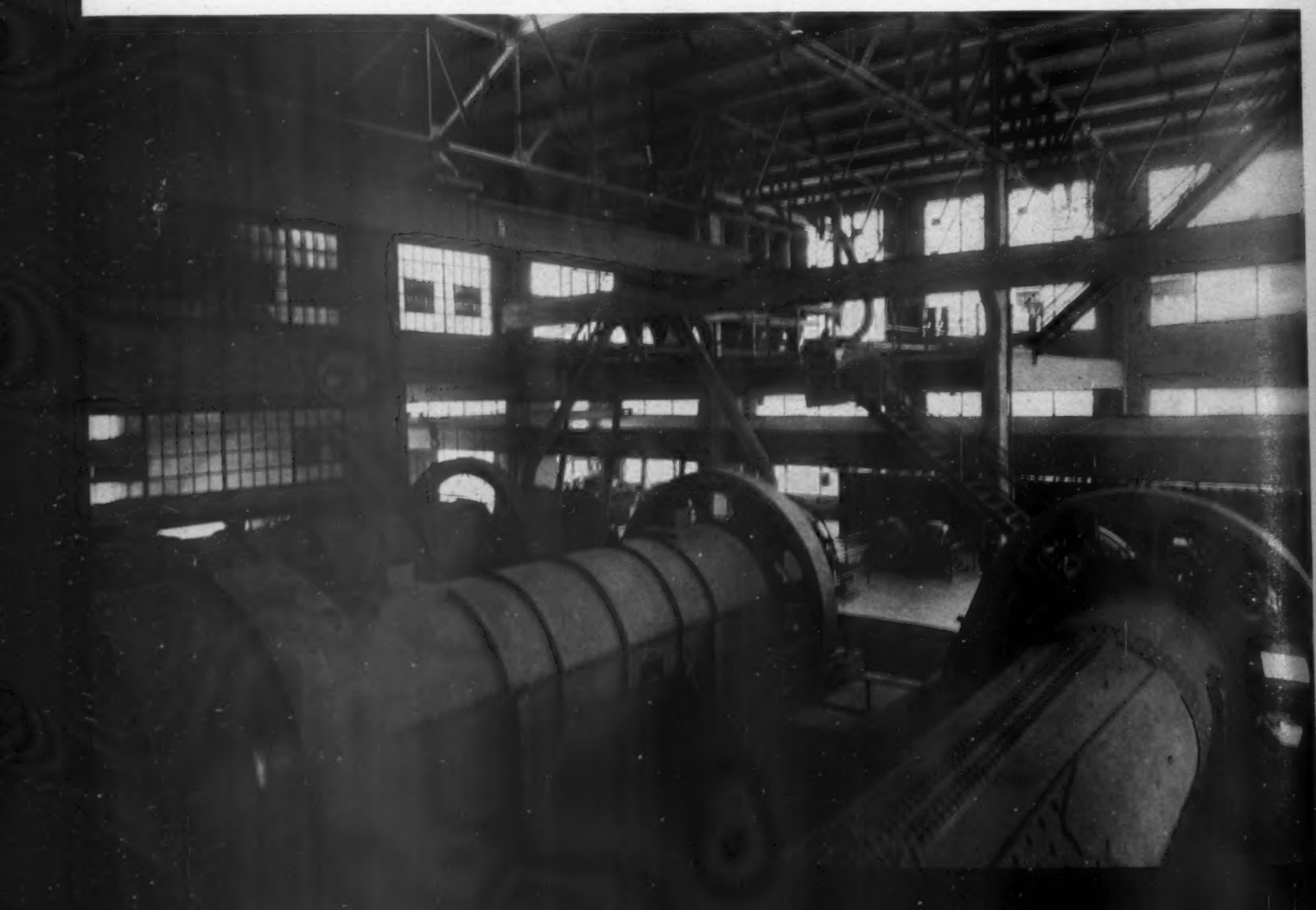
LEFT—Jacket on rotary cooler to preheat primary air, Republic

Republic, at San Antonio, Adds Water-Cooled Jackets on Mills, Air Separation; Lone Star, at Houston, Installs Three-Compartment Mills with Air Separators; Trinity, at Forth Worth, Adds Recuperators to Both Kilns

By Bror Nordberg

CEMENT PLANTS in Texas are keeping up in the matter of improvements and modernization, if my recent brief trip can serve as a criterion. At most plants in this area, manufacturing facilities are being added to make a better and more uniform product; and in some plants equipment is being added to manufacture high early strength and other special cements. One of the larger

BELOW—Finish mills, equipped with spray coolers, at Longhorn plant of Republic Portland Cement Co.



manufacturers reports a market requiring operation at 52% capacity, as compared to 26%, the low of 1933. Texas plants, as a whole, have about double the capacity of any demands yet made upon them.

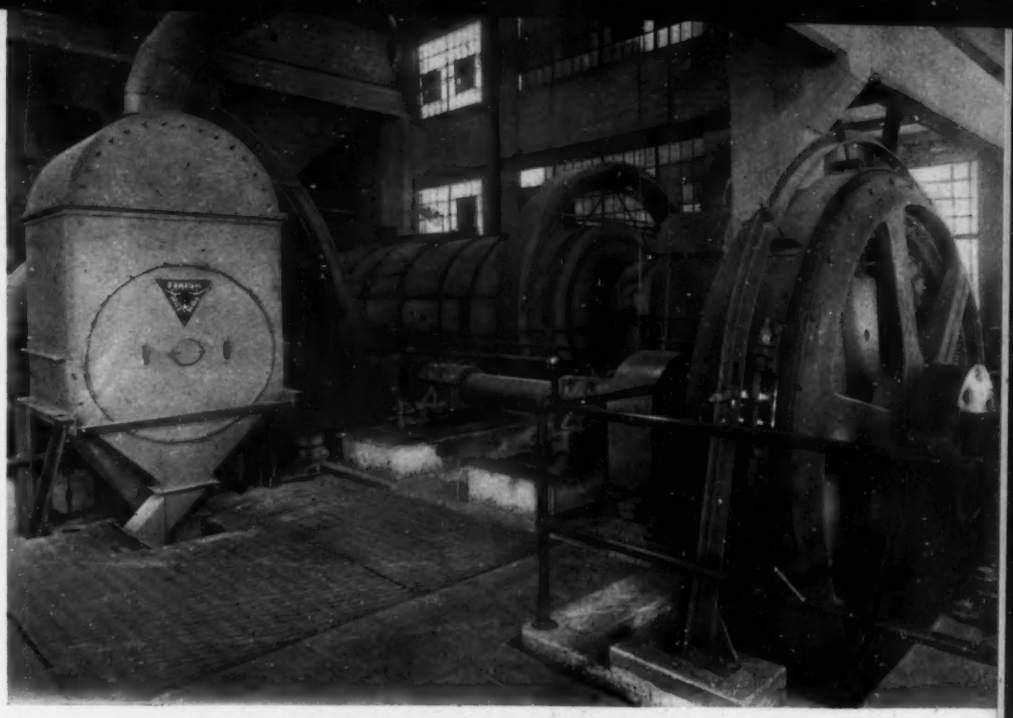
The following may serve as examples of what some of the plants are doing:

Republic

The plant of the Republic Portland Cement Co. at Longhorn was built in 1929, when machinery and equipment were installed for a capacity output of 1,250,000 bbl. of Longhorn (standard) cement annually. In recent years demands have changed. High early strength cements and special cements for certain engineering projects are now in vogue.

The company, in addition to its regular Longhorn portland cement, now manufactures Longhorn Hi-Kick, with higher early strength than normal portland cement; modified cements, low in alumina and high in iron content; and Longhorn Velo, a true high early strength cement, guaranteed to meet specifications of the A.S.T.M. and U. S. Government.

Flexibility, with a minimum loss of time in changeovers from the manufacture of one type of cement to any other, was desirable. A 16-ft. Sturtevant air separator was installed adjacent to the finish mills in April, 1936, to give the flexibility desired. The separator, driven by a 75-hp. Westinghouse motor through a Texrope drive, is incorporated into the system so that the mills can be made to operate independently of the separator or either mill can be closed-circuited with the separator. The finish mill discharge is handled to the separator by Link-Belt screw conveyors and elevators.

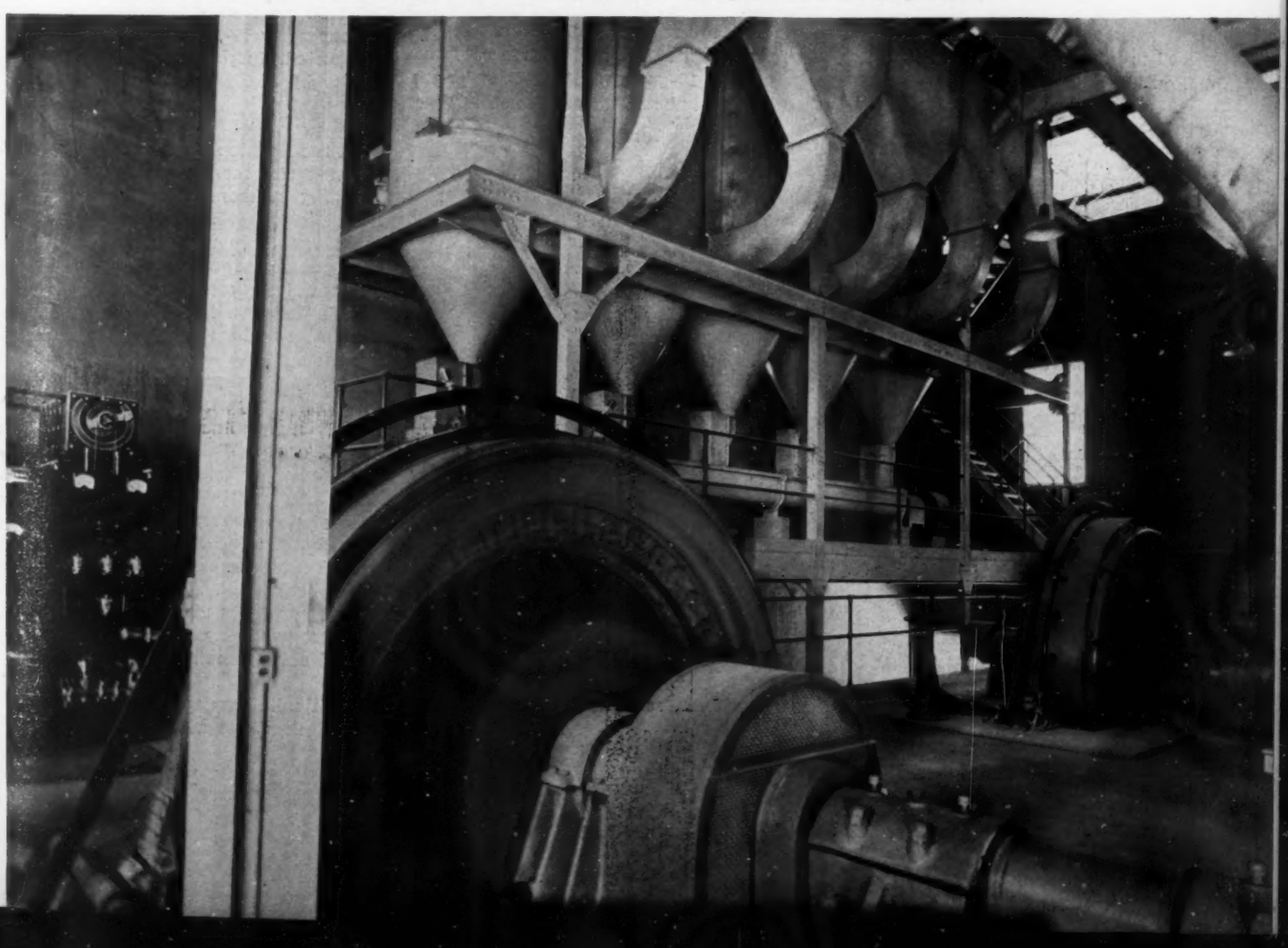


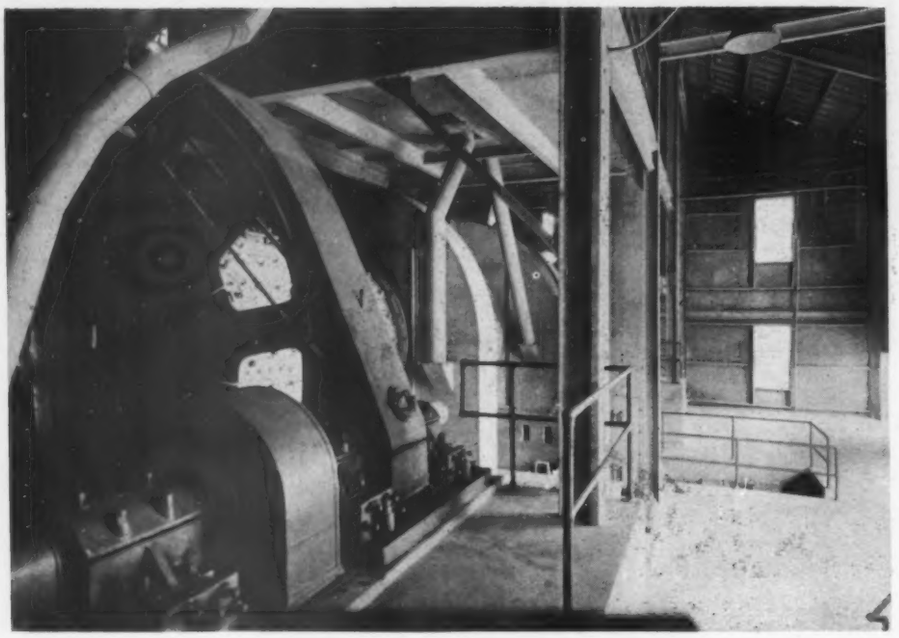
Side view of water-cooled tube mills, Republic Portland Cement Co.

A more uniform grinding has resulted, and production has been increased materially. Standard Longhorn cement is now manufactured with a fineness of 92-94% through 200-mesh, as compared to 80-88% before the separator installation; and Velo high early strength cement is ground to pass 97% through 325-mesh.

Another 1936 Republic installation that has served to increase production

Dust collectors for air-swept finish mills at Lone Star's Houston plant; the two 1000-hp. motors





Three-compartment finish mill at Lone Star plant as seen from discharge end

and quality is the addition of 30-ft. F. L. Smidth & Co. spray casings to each of the two 7 ft. by 40-ft. finish mills. A zinc filler was placed against the inner liner plates of each mill to eliminate the air gap and to permit the ready cooling of the mill loads.

The application of cold water sprays along the sides of the mills inside the spray casings has reduced the temperature of the mills by 90 to 100 deg. F. The result is a cooler cement, with a more uniform fineness and an increased feed is permitted—stepping up production.

Moreover, the installation permits the proper incorporation of gypsum, with excessively fine grinding, and has eliminated coating of the grinding rolls and subsequent flaking off into the finished product.

An interesting experiment is being made on the preheating of primary air for one of the kilns, using heat radiated from the shell of one of the rotary clinker coolers. Previous to this installation, primary air had been introduced to the kiln at atmospheric temperature.

The cooler is an Allis-Chalmers, 100 ft. in length with a 10-ft. diameter. A jacket of 16-gauge steel, 18-ft. in length, has been built to enclose the cooler over the lifter section at the point where the brick lining leaves off. There is a 12-in. air gap between the outer diameter of the cooler and the jacket. Metal straps at the ends of the jacket permit a tight fit.

The system is so constructed that air at atmospheric temperatures is pulled through the gap between the cooler shell and the jacket through four 12 in. by 20 in. adjustable openings below.

In order to reach the fan on the kiln floor above, this air circulates through the air gap between the cooler wall and the jacket. Radiated heat from the hot zone of the cooler raises the air from atmospheric temperature to approximately 275 to 300 deg., before it is piped to the kiln as primary combustion air. The air, being heated from the exterior of the cooler, is dust-free and consequently has no destructive action on the fan blades.

The installation has not been in use for a sufficient length of time to determine accurately the results, but a considerable saving in fuel has been effected, and no harmful effects on the temperature and quality of the clinker as coming from the cooler have been observed. Approximately 48% of the air necessary for combustion in the kiln is primary air, representing 13,000 cu. ft. per minute pulled through this improvised preheater. The kiln is 11 ft. in diameter and 250 ft. in length.

The Republic is expanding its clinker storage, in order to provide for special clinker, without reducing the storage allotted for standard clinker. A 75-ft. extension by 70-ft. in width will soon be completed, increasing the storage capacity by 35,000 bbl.

Lone Star

At the Houston plant of the Lone Star Cement Co., more modern methods of grinding clinker were recently introduced. Three Kominuters, three tube mills and three vibrating screens were replaced by two large compartment mills and air separators. The original tube mills were found to be too small for the capacity wanted at the fineness required.

The two Compeb mills installed are designed to operate as separate closed circuit units. Each mill is 40 ft. in length and is divided into three compartments, the compartment at the feed end having a 9½-ft. diameter, the other two sections being 8 ft. in diameter. Steel balls, 4- to 2-in. diam., are used in the first compartment, 1¼-in. balls in the center and ⅝-in. balls in the discharge compartment. The discharges of the first two compartments are air separated and the mill as a whole is air-swept.

Each mill has its individual gypsum and clinker bins and feeding tables to

Lone Star's closed-circuit finish-grinding system with 16-ft. air separator

proportion and regulate the flow of material to the mills. Each mill is installed so that it can be operated in closed circuit with a 16-ft. separator above, or in open circuit without the separator. Each unit has its own totally-enclosed bucket elevator to handle the circulating load, the only installation in common to both being the elevator which carries the finished product to the storage bins, this elevator operating on 65-ft. centers. Each mill is driven by a 1000-hp. super-synchronous motor through a spur gear.

A 5-unit dust collector gathers the fines from the elevators and screw conveyors and from the draft swept through the mills, by a fan driven by a 50-hp. motor. A 12-in. screw conveyor carries these fines from the separators to the discharge end of the mills where the two streams are combined into the finish elevator and belt conveyor to go to the storage bins.

Trinity

Trinity Portland Cement Co. has introduced Vanderwerp recuperators on both of its 250 ft. by 11 ft. 3 in. kilns at the Fort Worth, Tex., plant.

San Antonio

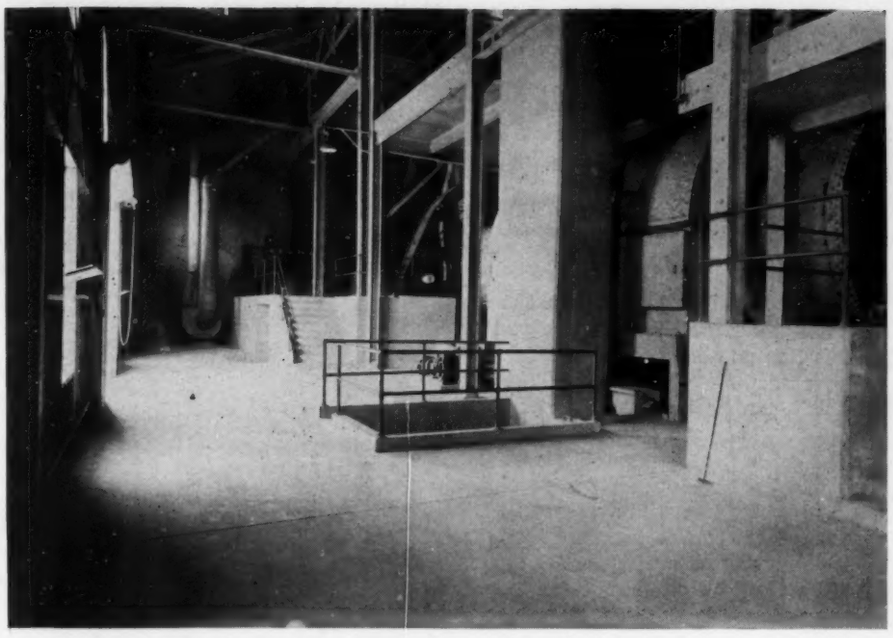
Among recent improvements at the San Antonio Portland Cement Co. are a 2000-hp. Rathbun-Jones Diesel engine, an 8-ft. by 50-ft. Traylor finish mill and a Lee process clinker cooler—the third at this plant installed in recent years.

Oklahoma

While the writer did not visit the plant of the Oklahoma Portland Cement Co. at Ada, Okla., the manufacture of dry ice from flue gas waste at this plant has aroused considerable interest among plant operators and is of importance as a possible valuable byproduct. The following article appeared in a recent issue of *Business Week:*

"Dry ice threatens to become important to the portland cement industry. Cement men are watching an experiment now on in Oklahoma, where the Oklahoma Portland Cement Co. at Ada is shipping from 10 to 15 tons of dry ice a day as a byproduct.

"Common practice in the manufacture of dry ice is to burn coke to produce carbon dioxide, from which the solid CO_2 or dry ice is made. Others, such as the alcohol producers, use the byproduct gases from fermentation. But in portland cement plants limestone and coal are burned and large quantities of carbon dioxide go up the chimney as the products of combustion. So about a year ago the J. P. Devine Manufacturing Co., a chemical process and oil refining equipment firm, interested the Ada plant in trying to recover this CO_2 from the flue gases.



Finish-mill as seen from the feed end, Houston plant. Fan for dust-collector is in background

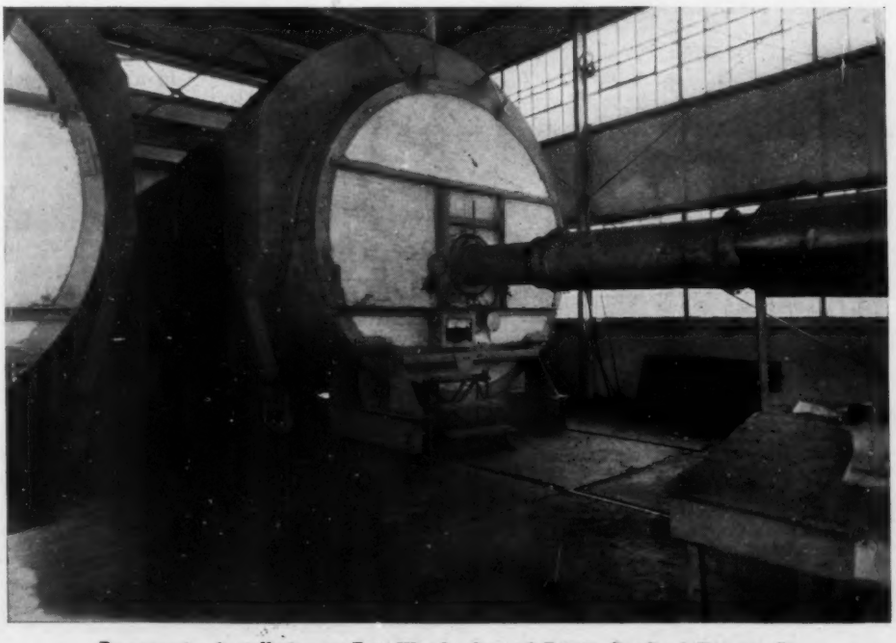
"They installed apparatus costing about $150,000 with a capacity of about 15 tons a day and are now producing it at a cost of about $7 a ton. This they deliver within a radius of 60 miles, using insulated trucks and handling the dry ice in large blocks with ice tongs. The delivery loss by evaporation is held to about 1%. They sell it for $30 a ton to the ice cream and carbonated beverage people, so that this byproduct produces a revenue of from $300 to $450 a day. They could dispose of more if they had the dry ice capacity and this being a large cement plant, further carbon dioxide production can be developed."

As Californians Do It!

CALAVERAS CEMENT CO., San Andreas, Calif., stock house employes were tendered a banquet September 19 at the Hotel Wolf, Stockton, Calif., by L. and F. Lindeman, Stockton trucking contractors, who hauled 140,000 sacks of cement from the plant to a paving project.

To Resume Production

RIVERSIDE CEMENT CO., Los Angeles, Calif., Oro Grande plant will resume operation around November 1, according to local reports. The plant has not been operated for several years.



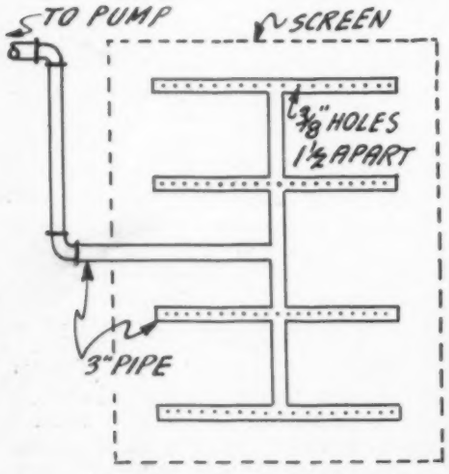
Recuperator installation at Fort Worth plant of Trinity Portland Cement Co.

HINTS AND HELPS FOR SUPERINTENDENTS

Homemade Shaking Screen

By Bert G. Clark
Brazil, Indiana

THE SCREEN illustrated in the accompanying sketch is my own idea and it has proved very successful. It is operated with a 1½-hp. gasoline engine. It can be built for between $20 and $30. This screen can handle 75 cu. yd. or better of washed gravel per day, with a No. 6 mesh screen cloth, taking pit run material averaging 30% gravel. I made the screen of a size suitable for my purpose, but of course it could be made larger or smaller to suit the operator's needs. The material is

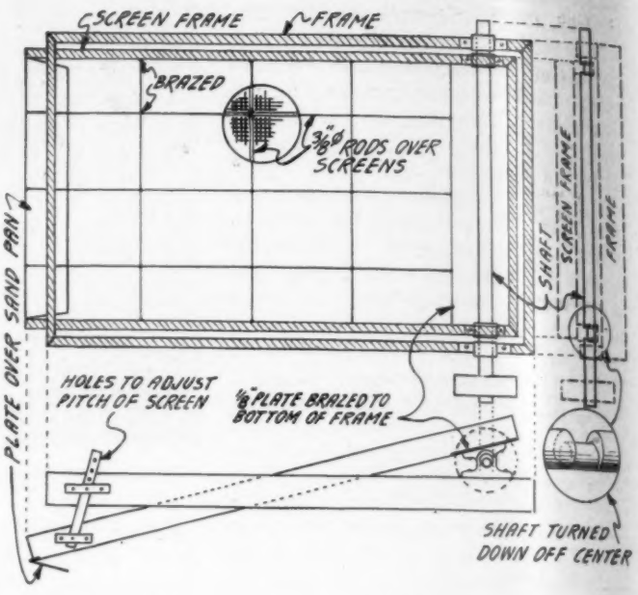


Spray arrangement for washing material on screen

washed as screened by the spray system shown in the acompanying sketch. We use a 3x4-in. centrifugal pump for wash water. The pit-run material is fed through a hinged gate to keep the flow uniform.

Utility Tractor

MOST PEOPLE familiar with quarry and crushing operations think that the only use for rubber goods around a quarry or crushing plant is for belts and for truck tires, but at the operation of the Catalina Rock Co., operated by Graham Bros., Inc., of Long Beach, Calif., everything that rolls on wheels is provided with rubber tires. These have been found better, cheaper, longer lasting and far more serviceable than steel or metal wheels. The Fordson tractor shown in the illustration finds a multitude of



Right—Construction details of inexpensive shaking screen

uses about the quarry and is provided with rubber tires. "They pay in the long run," is the verdict of those in

Tractor having rubber tires and a hoist

charge." The Fordson is also equipped with an Ersted hoist provided with a capstan head.

Double-Duty Pipe Rail

WHEN the American Limestone Co. (Knoxville, Tenn.) changed over its Strawberry Plains crushing plant from wood to steel superstructure a pipe rail was run along the stairs and walkway of the belt conveyor from the crusher to the top of screening plant.

This rail is a 1-in. steel pipe. The plant air compressor (Ingersoll-Rand, 10½x12½ in.) was connected to the top rail by means of a 1-in. pipe, underground. A turn of the valve at the lower end of the rail puts compressed air at 90 lb. pressure in the pipe rail, which also has a similar valve at the top.

Whenever it is desired to use compressed air for cleaning out a motor, or for using a drill, a flexible rubber hose is connected at the valves.

In case of a fire the pipe rail can be connected with the plant water supply, and thus it serves also as an emergency water main.

This rail can alternate as air pipe or water main

Handling Riprap

AT A west coast quarry riprap is loaded on barges and shipped by water to the place of use; the barges are loaded by a fleet of trucks.

The trucks are provided with removable bodies or "skips." These skips are 10 ft. by 10 ft. by 3 ft. high and are of wood construction, heavily reinforced with steel plate, especially the bottom. Near the corners have been provided four heavy "eye" bolts for the slings which are used for unloading the skips.

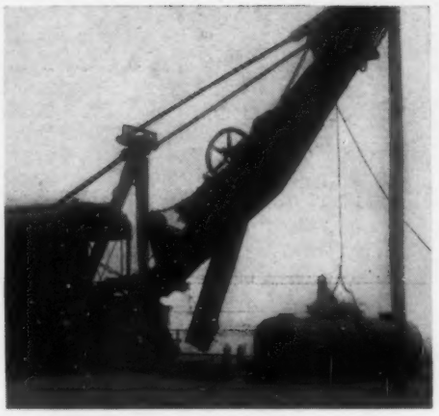
In operation the shovels load the skips and the trucks carry them to the unloading wharf where one of two stiff-leg derricks, with a specially designed sling, lifts the skip from the truck body and dumps it on the barge. In some cases (where the rock is small size) the skip is left on the deck of the barge, the truck returning to the quarry where extra skips are provided. In case the skips are left "as is" on the deck of the barge they are unloaded at the place of use by a derrick mounted on a scow and the empty skips returned to the quarry loading dock.

The boat, locally called "Noah's Ark," is loaded with empty skips that are being returned from one of the construction jobs.

Ancient Shovel Finds Use

The shovel shown in the illustration is No. C-1012 and was made by the Canada Foundry Co., Ltd., for the Bucyrus Co. It is a railroad type steam shovel and was for many years used as a quarry shovel. Idleness and rust have taken toll until the old relic is practically useless for the purpose for which it was designed, but it still finds a very modest use as a means of hoisting the water tank (used for road sprinkling) on and off the truck chassis.

Most of the rock now being handled



Ancient shovel serves to hoist water tank

at the quarry is riprap and the trucks used, as described above, have a special detachable body, and during most of the day are used for hauling riprap. When it is desired to sprinkle the roads one of the trucks is used as a source of power and is fastened to the lift-line. This assembly is then used to lift the water tank to and from a truck chassis.

Welding Torch To Remove Babbitt Eccentric Bearing

By Ross Wheelton
Aldershot, Ont.

THE ECCENTRIC bearing on many gyratory crushers must be periodically rebabbitted, the removal of the old babbitt being necessary before the new bearing can be poured. Most of the larger plant operators use a welding or cutting torch for this purpose, but I find that while many of the small plant operators have the necessary equipment available it does not seem to occur to them to use it for this purpose.

At our plant we had been taking the old metal off by the tedious and time-consuming method of hammer and chisel, until we recently acquired a cutting torch.

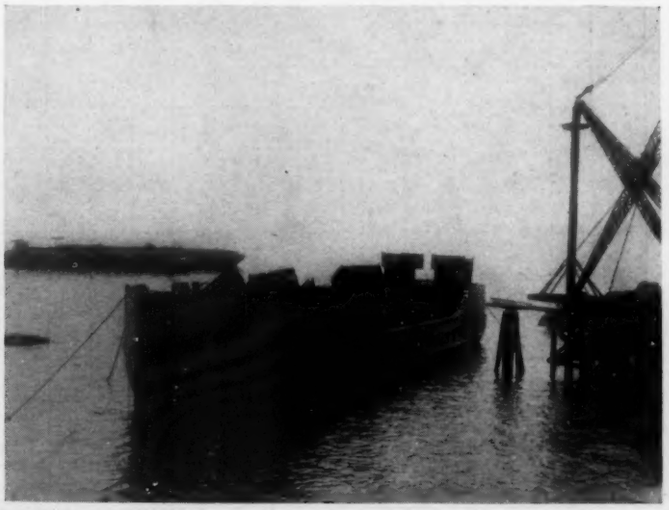
It is not necessary to melt all the metal out, two channels being cut from top to bottom as shown in the photograph, these being made if possible in line with the key holes in the casting, the three remaining sections can then be easily pried loose. The inside is a little more difficult to reach and is best just melted out, which only requires a few minutes in any case.

If the moulds have been set to size and the new metal heated before the old is removed, it is advantageous to pour the new bearing while the casting is still warm from the heat of the torch; in this way the babbitt will not chill as quickly while it is being poured and a better bearing will result.

The welding equipment firm tells us that a welding torch will cut more quickly than a cutting torch; however, as we have a cutting torch we use it and find it entirely satisfactory.

The time saved by removal in this way is considerable and if more small plant operators were acquainted with the method I am sure they would adopt it without hesitation. In addition to the saving in time the mild heating of the casting produces a better bearing.

Old babbitt may be cut out with welding torch more easily than by chisel



Left—Scene at a West Coast unloading wharf: a stiff-leg derrick has lifted skip from truck body and will place it on barge. Right—"Noah's Ark" is used for returning empty skips

Lime Producers' Forum

Conducted by Victor J. Azbe,

Consulting Engineer, St. Louis, Mo.

Lime Kiln Heat Balance

A PROGRESSIVE OPERATOR of a lime kiln, if he is to obtain the best possible results from his equipment, should know how the heat he is injecting is dissipated. If he is not familiar with this he cannot possibly guard against unnecessary loss. Only through a thorough knowledge of the various paths along which heat escapes, can he avoid waste.

A knowledge of heat balance is immensely helpful but determination of such a balance is far from simple, requiring for its determination not only a technically trained man, but one as well who has specialized in heat problems of lime kilns. Even in the case of such a person, the time necessary is so great that the determination is seldom undertaken.

If some short cut could be created by means of which heat balances could be obtained quickly, and by men not specially trained for this purpose, much could be accomplished in visualizing the losses and of avoidable waste. With this in view, the following charts were calculated and arranged for simple use.

Before they can be used, simple kiln tests must be made, such as determining an analysis of waste gases, their temperature as well as the temperature of lime drawn. To make such tests many men in the industry are now qualified and many plants equipped for this purpose. By means of these charts the information obtained from such testing equipment can be greatly increased and light shed on many a now dark problem.

These charts are based on high calcium lime and natural gas of approximately 1000 B.t.u. heat value per per cubic foot. To get a technically correct heat balance of a lime kiln would require several engineers testing for anywhere from two days to a week and later several days of figuring, as well as laboratory testing of fuel, stone and lime. The cost of such a balance would be from $500 to $1000, and then it would not be absolutely right. It still would have errors due to inability to obtain exact samples of gas, stone and lime, and their temperatures. Also fuel meters have only a limited accuracy.

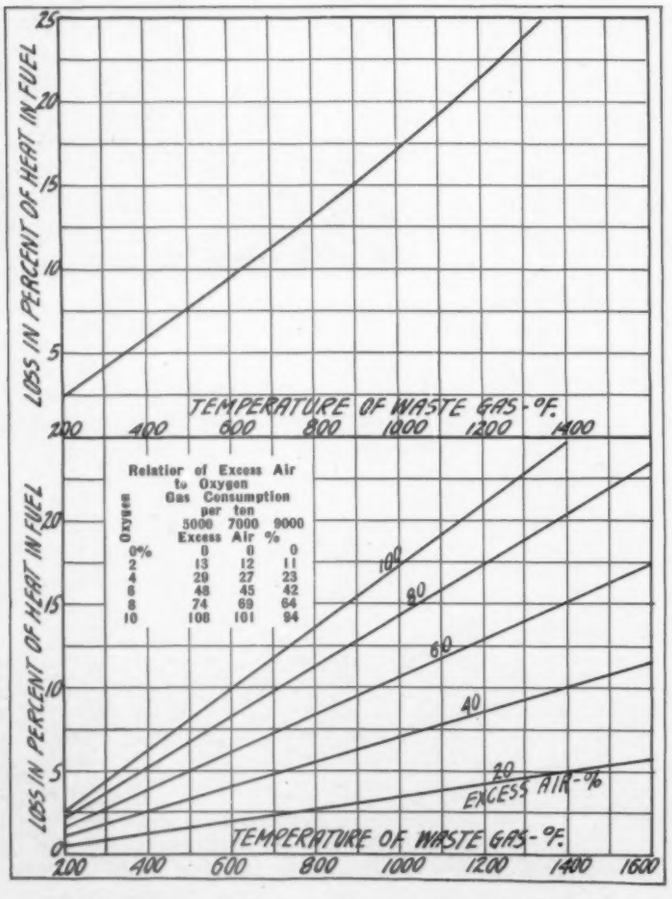
The method we propose here has, on account of its simplicity, a greater possibility for error, but as it happens, errors have a tendency to compensate each other and so the final results will be close enough to be of practical value. Assuming even that the accuracy is only as high as 90%, still to have 90% of something of great value is better than not to have it at all.

Sources of Heat Loss

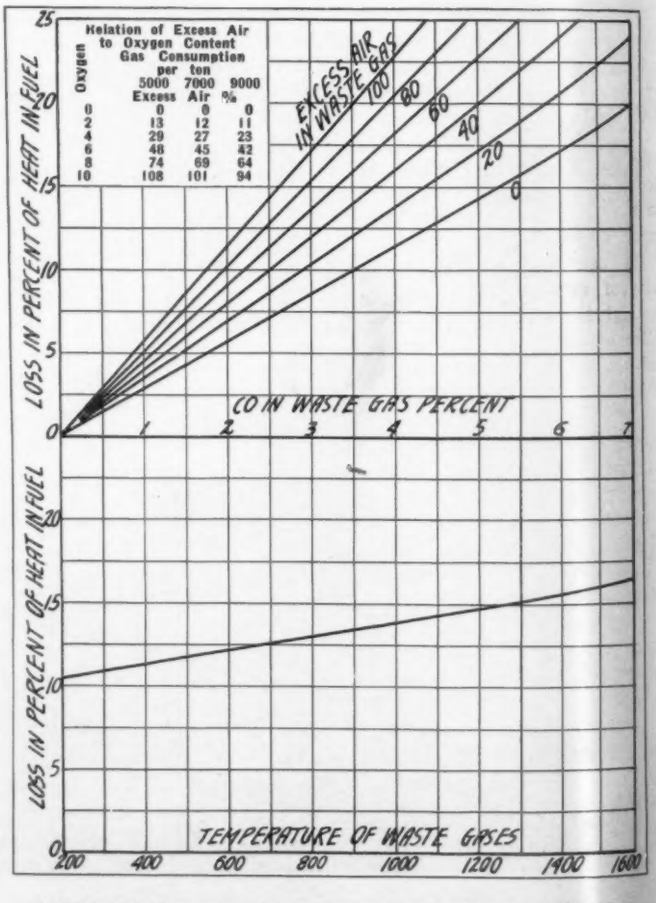
Fuel as it enters the kiln contains in its elemental combustible constituents, carbon and hydrogen. Air contains oxygen and nitrogen. Nitrogen is inert and passes through without any change. Oxygen combines with carbon to form carbon dioxide; it also combines with hydrogen to form water. The consequent carbon dioxide and nitrogen constitute the so-called *dry products of combustion*. These escaping to waste, hot, carry off heat, the amount of which depends upon temperature of the gases. Chart 1 deals with this loss.

How To Use Charts

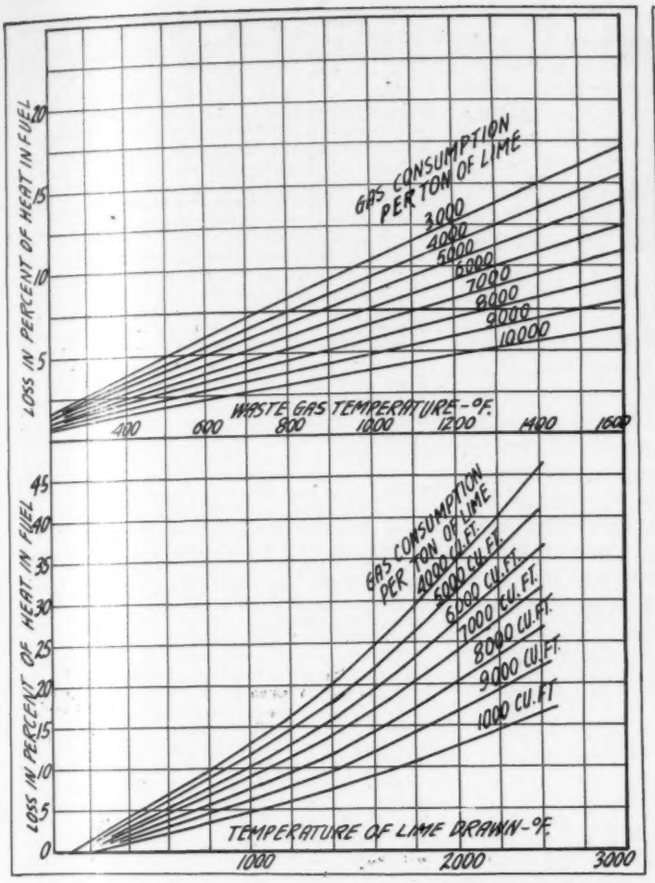
Assuming that the waste gas temperature is 1200 deg. F., this loss is 21.4%



UPPER—Chart 1: Loss due to dry products of combustion. LOWER—Chart 2: Loss due to excess air



UPPER—Chart 3: Loss due to incomplete combustion. LOWER—Chart 4: Loss due to vapor from combustion of hydrogen



UPPER—Chart 5: Heat loss due to CO_2 from limestone escaping hot from kiln. LOWER—Chart 6: Loss due to drawing of hot lime

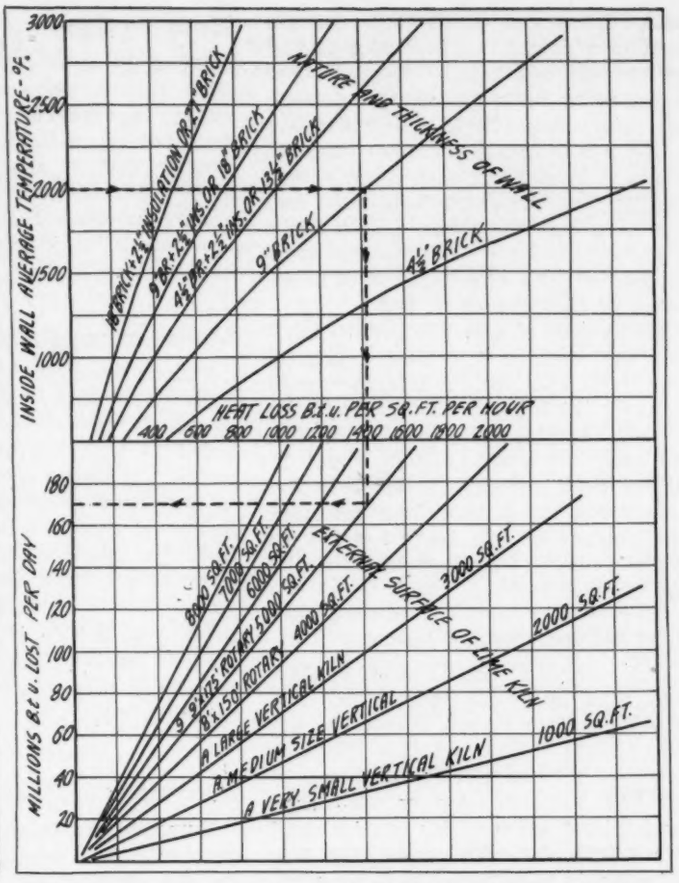


Chart 7—Heat escaping from the lime kiln by radiation constitutes a serious loss. Note the number of variables to be considered

of heat in the fuel, if the fuel is natural gas. This would apply to conditions existing in rotary kilns. With a vertical kiln, the average temperature of escaping gases should not be over 600 deg. F., in which case the loss as shown by the chart would be only 9.5%.

But usually with the ordinary products of combustion excess air passes through the kiln as well, often a rather large amount. Chart 2 deals with this loss due to excess air. Assuming that the rotary uses 9000 cu. ft. of gas per ton of lime and the oxygen content of waste gases is 2%, by the table accompanying the chart, it is shown that excess air is 11%. For this amount and 1200 deg. temperature, as in the case of a rotary kiln, the loss shown is about 2%. In the case of a vertical kiln gas consumption per ton of lime may be only 5000 cu. ft., so 2% of oxygen in the waste gases would mean an excess air content of 17%, which at 600 deg. F. represents a loss of about 1.3%.

A third important heat loss is due to *incomplete combustion*. Ordinarily when there is excess air, combustion is complete in rotary kilns, but not always so in vertical kilns, because in this case different zones may work differently. Assuming that there is no excess air, then 1% of CO, as demonstrated by Chart 3, would mean a loss of 3% of heat, and probably even more, as carbon monoxide may not be the only combustible escaping. There may be hydrogen as well. As we assumed presence of excess air in the rotary, we will give it no loss due to incomplete combustion. In the case of the vertical kiln we may, however, well apply the 3%.

Chart 4 shows the *loss due to water vapor* formed from combination of hydrogen in fuel with oxygen in the air. This is a loss about which little can be done. Temperature has some effect, but it is mainly a matter of the amount of hydrogen in the fuel. As shown by the chart, the loss from a rotary kiln at 1200 deg. F., escaping gas temperature would be 14.7% and for a vertical kiln with a temperature of 600 deg. F., 12.2%.

In addition to escape up the stack of normal gaseous products of combustion and of excess air, there is also the CO_2 derived from dissociation of calcium carbonate. As this gas escapes at kiln terminal temperature, naturally it causes a loss of heat. Chart 5 covers this loss due to CO_2 from stone and for a rotary kiln using 9000 cu. ft. of gas, the loss would be 5% when waste gas temperature is 1200 deg. F. With a vertical kiln using 5000 cu. ft. and a stack temperature of 600 deg. F., the loss would be 4.3%. The difference is not great as the vertical kiln makes so much more lime for a given amount of fuel, thus greatly increasing the amount of CO_2 in waste gases.

Easily Preventable Losses

A loss of very great importance is due to failure to regain the sensible heat in the lime drawn. Assuming the case of a rotary, if this has no lime cooler wherein the combustion air would be preheated, the temperature of lime drawn is 2200 deg. F., and the loss of heat by Chart 6 would be about 19%. If there is a cooler, but this is half effective, the loss would be proportionately less, or 9½%. In good vertical kiln practice where the lime is drawn cool the loss is likely to be only about 5%.

Very serious is the *loss due to radiation*, which is covered by Chart 7. A simpler chart could not be arranged as there were too many variables to consider. Starting out with the assumption that the rotary produces 150 tons of lime per day, with a gas consumption of 9000 cu. ft., of 1000 B.t.u. gas per ton of lime, then the total heat delivered by the fuel would be 1250 millions of B.t.u. per day.

In using the chart the example shown in dotted, arrowed line should be followed. Starting at 2000 deg. F. as the average inside wall temperature in the rotary, one should follow the line to the nature and thickness of the wall, which is 9-in. brick, then down to the kiln surface of a 9x175-ft. kiln, and over to where it is shown that the loss is 170 million B.t.u. per day. This proportion of the previously mentioned figure of 1250 million is 13.6%.

In the case of a vertical kiln the inside wall average temperature may be only about 1500 deg. F. The wall would be much thicker and possibly insulated as well. As kiln surface would be less, the heat loss would be only about 20 million B.t.u. per day. However, at the same time, amount of lime produced and amount of fuel burned would be much less also, which would bring the loss close to 10%.

Heat Balance From Charts

With very little information to start with, with very little figuring and in a very short time, we are enabled by the aid of these charts to obtain information that not one kiln operator in fifty now has. Not only have we established the contrast between the vertical and rotary kiln, but the reason for this difference in efficiency as well. In gathering in the results we obtain the following most interesting tabulation:

HEAT BALANCE OF A VERTICAL AND A ROTARY KILN
Using natural gas for fuel

	Vertical kiln	Rotary kiln
Heat loss due dry products of combustion	9.5%	21.4%
Heat loss due excess air	1.3	2.0
Heat loss due incomplete combustion	3.0	...
Heat loss due water vapor	12.2	14.7
Heat loss due CO_2 from stone	4.3	5.8
Heat loss due drawing hot lime	5.0	9.5
Heat loss due radiation	9.2	13.6
Total heat loss	44.5%	67.0%
Kiln efficiency	55.5	33.0
Gas consumption, cu. ft./ton lime	5000	8400

It is evident in the story above that the best point for improvement in the case of the rotary kiln is reduction of loss due to drawing of hot lime. If all this heat could be recovered improvement would be tremendous. It would tend to increase production, which automatically would lower the loss due to radiation.

Vertical Kiln Improvements

To improve a vertical kiln beyond what is shown is difficult. Smaller stone to cool the waste gases further would do it. A better insulated kiln, also; smaller loss due to incomplete combustion, probably; but the amounts possible are all small. In any case, however, the charts presented show what effect any change may have.

New Product

BASIC DOLOMITE, INC., Cleveland, Ohio, is producing and marketing "Calcimag," a dead-burned dolomitic lime, free flowing, with a density approximating that of sand, for use in the glass industry, with the claim that it eliminates losses from air slaking and the hazard to workmen handling free lime.

Lime Concentration

VALLEY FORGE CEMENT CO., West Conshohocken, Penn., has acquired by assignment from C. H. Breerwood, vice-president, U. S. Patent No. 2,021,623 for treating argillaceous limestone deficient in $CaCO_3$ by calcining to remove CO_2 but not to cause interaction of CaO and SiO_2; the roast is pulverized, the CaO being much more frangible, and subjected to air separation, the coarser parts, mainly SiO_2, being rejected until there is excess of CaO in the fines. The latter are then blended with unseparated material.

Increases Holdings

EVERETT LIME CO., Everett, Wash., has purchased additional limestone claims on the western slope of Whitehorse mountain near Darrington for a reported price of $20,000.

Demonstration of Salesmanship

UNIVERSAL ATLAS CEMENT CO.'s new president, Blaine S. Smith, was once the company's star salesman; and the experience of being chief executive of two large cement companies apparently has not changed him in that respect. As a brief lesson (or if one prefers, a study) of the art of all-around salesmanship, the editor believes the following little story from the *Birmingham* (Ala.) *News* of September 18 is of interest to most readers:

LEEDS, Ala.—The local unit of the Universal-Atlas Cement Company has operated at a higher rate than any of the other 17 plants of the company and the reconstruction involving the expenditure of approximately $1,000,000 is going forward in a satisfactory manner, according to Blaine Smith, president of the company.

He came to Leeds for his initial visit since taking over the affairs of the far-flung cement operations of the United States Steel Corporation.

Mr. Smith was received by many industrial leaders in the district during his visit and made a distinct impression upon local operators by his unaffected manner, his unrestrained enthusiasm about the Birmingham district and his forecast that Birmingham is destined to reach dizzy heights in her march towards industrial achievement.

"The Leeds plant of the Universal-Atlas Cement Company, is a splendid operation," said President Smith. "It is true the plant is 30 years old, but its record is far above many others built later and when the remodeling is completed, it will be even better. During the past few years it is interesting to note the Leeds plant has operated at a greater average rate than any of the cement plants of the company. The proximity of the plant to the gigantic government building in the South would possibly be one reason for this distinction.

"The expenditure of about $1,000,000 at Leeds now engaging our attention will result in a thoroughly modern operation. We have learned many things about cement operations lately and our experiences will be incorporated in the new work. It is to be expected that the plant will be much cleaner and that dust will be less irritating over the immediate plant area than in the past.

"The Leeds plant is in charge of a capable staff and we are confident the future will result in greater achievements at that point. Leeds has lately attracted the attention of industrialists over a wide area through the cultivation of a deeper friendship between the civilian population of the nearby communities and the industrial workers. The skill and the patience which has gone into this work during the past has impressed everyone interested." Continuing, the youthful-looking chief executive of the cement units indicated that community esteem between the two groups was one of the most valuable civic programs.

Mr. Smith in company with Vice President Van Zandt left by plane Friday afternoon for New York. His plants are scattered from Waco, Tex., ,to the Eastern seaboard and he is engaged in a complete circle on this initial trip. He said he expected to return to Leeds during the next few months and at that time would renew friendships made here during the past two or three days.

During his trip here he was piloted by L. M. Funderburg, in charge of Leeds operation, upon whom President Smith passed very flattering opinions.

Lime Promotion

UNITED STATES GYPSUM CO., Chicago, Ill., has just issued a very attractive and instructive 48-page booklet on "Lime." It contains a brief description of what lime is and how it is made. Then follow chapters on the use of lime in building construction, for industrial and chemical uses, and in agriculture. The highly competitive matter of high calcium and dolomite limes, and lime mortars and plasters, are handled with the tact necessary to an organization that sells and promotes all kinds of lime, and gypsum as well. Indeed the booklet should prove of much value to lime manufacturers as an example of effective promotional literature, minus the odious comparisons and references to competitive materials which abound in nearly all other samples of promotional material on lime. J. A. F. Wendt is manager of the company's lime sales.

Digest of Foreign Literature

By F. O. Anderegg,
Consulting Specialist in Building Materials, Newark, Ohio

Certain Alteration Phenomena in Aluminous Cement Concrete—Alkalies present in portland cement have often given rise to troublesome side reactions including decomposition of paint coatings, staining of Indiana limestone, corrosion of lead cable sheathing, efflorescence, among others; and it has been found that alkalies, whether coming from concretes made from other than alkali containing cement, or coming from the adjacent soil, have caused disintegration of poorly produced and porous concrete electric light poles made with aluminous cements. This study was carried out by E. Rengade, P. L'Hopitallier and P. Durand de Fontmange, who were able to show very definitely that only in lean porous concrete, gaged with a rather high water-cement ratio, did any attack take place and that alkali was responsible. They made up specimens and placed them in contact with concrete made with a variety of cements containing different amounts of alkali. When the latter was greater than 1% of the weight of the cement, disintegration started within 48 hours in aluminous cement specimens of adequate porosity. At 0.6% alkali the action became perceptible in 35 days, while contact with another cement having only 0.30% alkali required 90 days. On the other hand, contact with a nonstaining cement (LaFarge) having only traces of alkali, produced no result in three years, while on adding alkali to the nonstaining cement, decomposition set in the faster the more alkali was added.

On shaking aluminous cement, hydrated and reground, three times with water and KOH or K_2CO_3, it was found that the alumina dissolved reached a rather high value, practically constant after 7 days and depending upon the alkalinity. The carbonate, of course, precipitated out the lime, thereby accelerating the reaction. What happens in actual practice is a slow movement from the soil or adjacent concrete of the readily soluble alkali either as hydroxide or carbonate up through the porous base of the pole to the surface where the moisture evaporates leaving the alkali to concentrate, react to precipitate lime, to take the alumina into solution from which it is reprecipitated by CO_2 from the air, setting the alkali free again. The latter has thus a catalytic destructive action on the aluminous cement. Certain cases have been found where aggregates have contributed alkali to aid in the disintegration of the cement, so a series of tests was run on soluble alkali obtained from feldspar and similar alkali containing aggregates and compounded with the alkali determined by analysis, a fairly good correlation being observed.

• • •

The SO_3 Content in Portland Cement Clinker—The possibilities of using cement raw materials of comparatively high sulfide content has been carefully considered by G. Mussgnug. As the temperature increases during burning more of the sulfur is removed by decomposition of the sulfate formed under the oxidizing condition usually prevailing, and it seems to be quite reasonable to work with a clinker having not more than 2% SO_3. If the burning is under reducing conditions, sulfur is more readily eliminated, however. This sulfate in the clinker is supposed to have no harmful effect on the properties of the cement so long as suitable reduction is made in the amount of gypsum to be added. The larger SO_3 content helps to control free lime in the clinker. Clinker having not too high lime or aluminum content and about 1.8% SO_3 present can be ground into slow setting cements without adding any gypsum. Soundness of the cement is helped by SO_3 in the clinker the same as by adding gypsum; but for developing good strength, especially in compression, added gypsum is more effective than SO_3 in the clinker. This is connected with the great reduction in rate of solubility of SO_3 in the clinker as compared with gypsum. The latter, of course, is more effective in controlling the setting time. Such sulfate-rich clinkers with no added gypsum expand less but shrink a little more than mixtures of low SO_3 clinker and gypsum. The heat of hydration does not seem to be affected by SO_3 content. *Zement* (1936) 25, No. 15, p. 253; No. 16, p. 268.

• • •

Effect of Sulfate Solutions on Various Cements—After giving the results of analysis for soluble silica in several Japanese pozzuolans, S. Nagai and K. Nomi ground one of these having about 35% soluble silica with 1½ parts portland cement clinker. The results were compared with an aluminous cement, one standard and one high early strength portland and one blast furnace cement purchased on the open market, according to the standard earth-dry specifications and similar results were obtained. But on making plastic mortar tests the aluminous cement gave much better results, while the two with the siliceous admix were lower, especially at early ages. On storing in 10% sodium sulfate, however, the two latter gave best results. *Journal of the Society of Chemical Industry*, Japan, (1936) 39, No. 5, p. 159B.

• • •

Manganese-Chromium Portland Cement Develops Good Strength in Cold Weather—K. Akirjama has prepared clinkers containing about 1% Cr_2O_3 and about 0.8% Mn_2O_3 on a fairly large scale and has found much greater early strength on storage in ice water than developed by cements made under identical conditions without the additions. The heat of hydration is greater and the workability is better for the addition of these oxides. *Journal of the Society of Chemical Industry*, Japan, (1936) 59, No. 3 p. 1053.

• • •

Fluorides Help in the Synthesis of Calcium Silicates—In the synthesis of various silicates of calcium the efficacy of different fluorine compounds decreases from cryolite through NaF, Na_2SiF_6, MgF_2, CaF_2, to Mg_2SiF_6. Feldspar and fine window glass also add in the formation of the tri-silicate, according to S. Nagai and M. Takahara. *Journal of the Society of Chemical Industry*, Japan, (1936) 36, No. 4, p. 130B.

• • •

The Determination of Free Lime in Hardened Cements and of Free and Combined Lime in Cement-Trass Mixtures. The first results appeared in ROCK PRODUCTS (1935) No. 10, p. 45, and this digest gives the results obtained by V. Rodt for storage up to 19 months. Generally, where portland cement is present, the free lime and ignition loss are at a maximum after 2 or 3 months wet storage, followed by little change in the ignition loss and a slow reduction in the amount of free lime. In the slag (Hochofen) cements, however, the change of free lime amount is quite small. It is to be noted that no satisfactory connection between the processes of hardening and the free lime content can be observed. In lime-trass mixtures the amount of free lime decreases and the amount of the lime which has combined with the trass increased with time up to about 25% of the weight of the trass. The question of the effect of any alkali metal alkalinity on the determination was carefully considered and the total amount of alkali in the glycerine solution was determined, as well as that obtained by treating trass with HCl and the total amount present in the trass. HCl removes only a small part of the alkali from trass and glycerine still less, but suitable corrections should be made. The most important point is evidence of actual combination of the trass with about ¼ its weight of lime. *Zement* (1936) 25, No. 11, p. 161.

Recent Quotations on Rock Products Securities

Stock	Date	Bid	Asked	
Allentown P. C., com.[47]	9-21-36	4	5	
Allentown P. C., pfd.[47]	9-21-36	6	8	
Alpha P. C., com	9-23-36	24¼	25	.25 (qu.) Oct. 24
American Aggregates, 1st mtg. 3/6's, 1943, new bonds[48]	9-17-36	50	53	
American Aggregates, 1st mtg.	9-17-36	50	..	
American Aggregates, com.[48]	9-17-36	¾	1¾	
American Aggregates, pfd.[48]	9-17-36	4	6	
Arundel Corp., com	9-23-36	18½	actual sale	.25 (qu.) Oct. 1
Ash Grove L. & P. C., com.[47]	9-21-36	13	15	
Ash Grove L. & P. C., pfd.[47]	9-21-36	97	100	
Bessemer L. & C., cert. of dep., 1947[46]	9-18-36	89	91	
Bessemer L. & C., com.[47]	9-21-36	8	9	
Bessemer L. & C., pfd.[47]	9-21-36	30	33	
Bessemer L. & C., 6's, 1955	9-22-36	90	93	
Bessemer L. & C., 1st 6½'s, 1947[48]	9-17-36	90	..	
Boston S. & G., com.[37]	9-16-36	1	2	
Boston S. & G. 7% pfd.[37]	9-16-36	6	9	
Boston S. & G., 7's, 1939[37]	9-16-36	70	..	
Calaveras Cement, com.[40]	9-17-36	5½	6½	
Calaveras Cement, 7% pfd.[40]	9-17-36	92	94	
California Art Tile, A[9]	9-18-36	16¼	16½	
California Art Tile, B[9]	9-18-36	2½	3½	
Canada Cement, com.[43]	9-18-36	7⅝	7½	
Canada Cement, pfd.[43]	9-18-36	86½	87	
Canada Cement, 5½'s, 1947[43]	9-18-36	108	..	
Canada Cement, 4¼'s, 1951[43]	9-18-36	101	102	
Canada Crushed Stone, 6½'s, 1944[43]	9-18-36	90	..	
Consol. Cement, 1st 6's, 1950[50]	9-23-36	78	80	
Consol. Cement, A[50]	9-23-36	6	6½	
Consol. Okla. S. & G., 6½'s, 1948[43]	9-18-36	10	..	
Consol. S. & G., pfd.[43]	9-18-36	32	..	
Consol. Rock Products, units[47]	9-21-36	90c	1	
Construction Mat., com.[47]	9-21-36	20c	30c	
Construction Mat., pfd.[47]	9-21-36	75c	1	
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948[47]	9-21-36	29	32	
Coosa P. C., 1st 6's[47]	9-21-36	35	40	
Coplay Cement Mfg., pfd.[47]	9-21-36	14	16	
Coplay Cement Mfg., 6's, 1941[47]	9-21-36	95	100	
Cumberland P. C., 7's, 1937[47]	9-21-36	95	100	
Cumberland P. C., pfd.	9-20-36	43	50	
Dewey P. C., com.[47]	9-21-36	50	55	
Dolese & Shepard	9-24-36	37½	40	1.00 Sept. 30
Dufferin Pav. & Cr. Stone, pfd.[43]	9-18-36	64½	67½	
Federal P. C., 6½'s, 1941[47]	9-21-36	50	55	
Fla. P. C., units[47]	9-21-36	21	22	
Fla. P. C., 6½'s, 1937[46]	9-18-36	100	101	
Giant P. C., com.[50]	9-25-36	9	10	
Giant P. C., pfd.[50]	9-25-36	30	32	
Gyp., Lime & Alabastine, Ltd.	9-18-36	9	9¾	
Gyp., Lime & Alabastine, 5½'s, 1948[47]	9-21-36	100	101	
Hawkeye P. C., cap.[47]	9-21-36	33	35	
Hercules Cement, com.[47]	9-21-36	35	40	
Hercules Cement, pfd.[47]	9-21-36	90	95	
Hermitage Cement, com.[47]	9-21-36	15	18	
Hermitage Cement, pfd.	9-20-36	103	108	
Ideal Cement, com.[50]	9-23-36	82	84	{ .50 (qu.) Oct. 1 { .50 (ex.) Oct. 1
International Cement, com	9-23-36	55⅛	55¾	.50 Sept. 29
International Cement, conv. deb. 6's, 1945	9-23-36	157½	actual sale	
Kelley Island L. & T.	9-18-36	24¼	25	{ .25 (qu.) Sept. 30 { .05 (ex.) Sept. 30
Ky. Cons. Stone, 6½'s, 1938[47]	9-21-36	18	20	
Ky. Cons. Stone, com.[47]	9-21-36	1	2	
Ky. Cons. Stone, pfd.[47]	9-21-36	3	5	
Ky. Cons. Stone, 1st mtg., 6½'s[46]	9-16-36	15	16½	
Ky. Rock Asphalt, 6½'s, 1936[47]	9-21-36	28	30	
Lawrence P. C., com	9-22-36	26¼	28½	
Lawrence P. C., 5½'s, 1942[50]	9-23-36	100½	101½	
Lehigh P. C., com	9-23-36	28½	29⅛	
Lehigh P. C., 4% pfd.[50]	9-23-36	117	actual sale	1.00 (qu.) Oct. 1
Louisville Cement[47]	9-21-36	100	105	
Lyman-Richey 1st 6's, 1935[50]	9-23-36	27	..	
Marbelite Corp., com. (cement pts.)[40]	9-17-36	35c	..	
Marbelite Corp., pfd.[40]	9-17-36	4½	..	
Marblehead Lime, 7's, 1944[44]	9-18-36	96	98	
Marquette Cement, com.[50]	9-23-36	37½	39	
Marquette Cement, pfd.[50]	9-23-36	99	..	
Material Service Corp.[47]	9-21-36	8	9	
McCrady-Rodgers, com.[47]	9-21-36	6	7	
McCrady-Rodgers, 7% pfd.[47]	9-21-36	30	35	
Medusa P. C., com	9-18-36	24	25	
Medusa P. C., pfd.[47]	9-21-36	55	65	
Michigan L. and C., com.[47]	9-21-36	42	45	
Minnesota Mining & Mfg. Co.[50]	9-21-36	33½	actual sale	{ .25 (qu.) Sept. 30 { .10 (ex) Sept. 30
Missouri P. C.	9-23-36	16	16½	.35 Oct. 31
Monarch Cement, com.[47]	9-21-36	98	100	6% Oct. 1
Monolith P. C., com.[9]	9-18-36	3	3½	
Monolith P. C., 8% pfd.[9]	9-18-36	6¾	7¼	
Monolith, P. C., units[9]	9-18-36	16½	18	
Monolith P. C., 1st mtg.[9]	9-18-36	104	105½	
Monolith Portland Midwest, pfd.[9]	9-18-36	2⅝	2⅝	
National Gypsum, A, com.[47]	9-21-36	49	50	
National Gypsum, 1st pfd.[47]	9-21-36	103	104	1.75 (qu.) Oct. 1
National Gypsum, 2nd pfd.[47]	9-21-36	17	18	.25 (qu.) Oct. 1
National L. & S., 6½'s, 1941[47]	9-21-36	95	100	
Nazareth Cement, com.[47]	9-21-36	8	9	
Nazareth Cement, pfd.[47]	9-21-36	60	65	
Newaygo P. C., 7% cum. pfd.[47]	9-21-36	75	80	
New England Lime, units[14]	9-18-36	12½	15	
N. Y. Trap Rock, 1st 6's, 1946	9-18-36	84	89½	
N. Y. Trap Rock, 6's, stamped, 1946	9-23-36	90	actual sale	
N. Y. Trap Rock, 7% pfd.[46]	9-16-36	60	63	
North Amer. Cement, 1st 6½'s, 1953	9-25-36	48	50	
North Amer. Cement, 6½'s, 1943[50]	9-23-36	96¼	97¼	
North Amer. Cement, 6½'s, 1940[50]	9-23-36	68	72	
North Amer. Cement, "A" pfd.	9-25-36	4¼	5¼	
North American Cement "B"[47]	9-21-36	5	6	
North Shore Mat. 1st 6's[47]	9-21-36	35	40	
Northwestern P. C., units[9]	9-18-36	55	60	
Northwestern States P. C.[47]	9-21-36	22	23	
Ohio River S. & G., com	9-23-36	1	...	
Ohio River S. & G., 1st pfd.	9-23-36	63	...	
Ohio River S. & G., 2nd pfd.	9-23-36	4	...	
Ohio River S. & G., 6's[46]	9-16-36	10½	12	
Oregon P. C., com.[47]	9-21-36	3	4	
Oregon P. C., pfd.[47]	9-21-36	92	95	
Oregon P. C., conv. pfd.[47]	9-21-36	60	65	
Pacific Coast Agg., new com.[40]	9-17-36	3	3⅛	
Pacific P. C., com.[40]	9-17-36	4½	6	
Pacific P. C., pfd.[40]	9-17-36	50	53	
Peerless Cement, com[50]	9-23-36	2⅜	3½	
Peerless Cement, pfd.[50]	9-23-36	24	28	
Penn.-Dixie Cement, com	9-24-36	6¼	actual sale	
Penn.-Dixie Cement, pfd. A	9-23-36	36¾	38¾	
Penn.-Dixie Cement, 6's, A, 1941	9-23-36	95½	actual sale	
Penn. Glass Sand Corp., com.[47]	9-21-36	20	23	
Penn. Glass Sand Corp., pfd.[47]	9-21-36	120	125	1.75 (qu.) Oct. 1
Penn. Glass Sand Corp., 1st M 4½'s, 1960	9-18-36	105¼	...	
Petoskey P. C., 6's, 1935-38[43]	9-17-36	98½	...	
Petoskey P. C., 6's, 1941[43]	9-17-36	94	...	
Petoskey P. C., com.[43]	9-17-36	4¼	4¾	
Republic P. C., 6's, 1943[50]	9-23-36	103	...	
Riverside Cement, A[9]	9-18-36	11¼	12	
Riverside Cement, B[9]	9-18-36	1	1½	
Riverside Cement, pfd.[9]	9-18-36	100	105	
Rockland & Rockport Lime, 1st pfd.[47]	9-21-36	5	7	
Santa Cruz P. C., pfd.[9]	9-18-36	43	48	.50 Oct. 1
Schumacher Wallboard, com.[9]	9-18-36	3½	4¼	
Schumacher Wallboard, pfd.[9]	9-18-36	17	18	
Signal Mt. P. C., units[50]	9-23-36	47	50	
Southwestern P. C., units[40]	9-17-36	200	...	
Spokane P. C., units[47]	9-21-36	12	15	
Standard Pav. & Mat. (Can.), com.	9-25-36	3	...	
Standard Pav. & Mat., pfd.[42]	9-18-36	20	24½	
Superior P. C., A[40]	9-17-36	42½	44	.27½ Oct. 1
Superior P. C., B[40]	9-17-36	13	14	
Trinity P. C., units[47]	9-23-36	35	...	
U. S. Gypsum, com	9-23-36	100¼	102	.50 (qu.) Oct. 1
U. S. Gypsum, pfd.	9-18-36	164¼	...	1.75 (qu.) Oct. 1
Volunteer P. C., 1st 7's, 1942[47]	9-21-36	97	100	
Volunteer P. C., units[47]	9-21-36	4	5	
Vulcanite P. C., com.[47]	9-21-36	6	8	
Vulcanite P. C., 7½'s, 1943[47]	9-21-36	98	100	
Wabash P. C.[47]	9-21-36	10	11	
Warner Co., ww, 1st 6's, 1944[47]	9-21-36	80	81	
Warner Co., com.[47]	9-21-36	5	6	
Warner Co., pfd.[47]	9-21-36	14	15	
Whitehall Cement Mfg. com.[47]	9-21-36	48	50	
Whitehall Cement Mfg., pfd.[47]	9-21-36	48	50	
Wisconsin L & C., 1st 7's, 1940[47]	9-21-36	80	85	
Wolverine P. C., com.[47]	9-21-36	6	7	
Yosemite P. C., A com.[40]	9-17-36	5½	5¾	

Quotations by: [9]A. E. White Co., San Francisco, Calif. [14]The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [37]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbitt, Thomson & Co., Toronto. [43]First National Bank of Chicago, Chicago, Ill. [47]Anderson Plotz and Co., Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [50]Rogers & Tracy, Inc., Chicago, Ill.

Recent Dividends Announced

Alpha P.C., com. (quar.)	$0.25	Oct. 24, 1936
Arundel Corp., com. (quar.)	.25	Oct. 1, 1936
Coronet Phosphate Co.	1.00	Oct. 1, 1936
Dolese & Shepard	1.00	Sept. 30, 1936
Ideal Cement, com. (quar.)	.50	Oct. 1, 1936
(extra)	.50	Oct. 1, 1936
Kelley Island L. & T. (quar.)	.25	Sept. 30, 1936
(extra)	.05	Sept. 30, 1936
Minn. Mining (quar.)	.25	Sept. 30, 1936
(extra)	.10	Sept. 30, 1936
Missouri P.C.	.25	Oct. 31, 1936
Monarch Cement Co.	6%	Oct. 1, 1936
Santa Cruz Cement	.50	Oct. 1, 1936
Superior P.C., A	.27½	Oct. 1, 1936

INTERNATIONAL CEMENT CORP., New York City, 4% convertible debenture bonds, issued last November to redeem about the same amount (approximately $12,000,000) of 20-year 5% convertible debentures are now quoted at around 160%, and it is expected that most of them will be converted into common stock by January 1, when the conversion figure is raised from $35 to $40 per share. The current price of the common stock is around $56. The lowest price the bonds reached this year was 115⅜%.

◆ ◆ ◆

IDEAL CEMENT CO., Denver, Colo., and subsidiaries, reported for the year ending December 31, 1935:

Net earnings from operations after depreciation, depletion and Federal tax	$1,335,709
Miscellaneous earnings aside from cement manufacture	266,039
Total	$1,601,748
Interest paid on debentures	69,111
Net earnings	$1,532,637
Earnings per share on 458,271 shares of common stock (no par)	$3.34

◆ ◆ ◆

YOSEMITE PORTLAND CEMENT CO., Merced, Calif., has called its annual stockholders' meeting for October 9, at which time a vote will be taken on the plan to authorize 270,000 shares of $10 par 4% noncumulative preferred stock in exchange for 221,451 outstanding shares of class A common 8% stock and to restate par value of 140,800 outstanding class B shares from $10 to $1 a share. The plan also provides for payment of a pro rata share of present earned surplus to nonconverting class A common shares.

◆ ◆ ◆

NATIONAL GYPSUM CO., Buffalo, N. Y., reports for the six months ended June 30, 1936, a net profit of $408,382 after depreciation, depletion, interest, reserve for doubtful accounts, federal income taxes and other charges. No mention is made of any provision for federal surtax on undistributed profits. Net is equal, after dividend requirements on 7% cumulative first preferred and 5% noncumulative second preferred stocks and under the participating provisions of the common shares, to $1.12 a share on combined 229,596 shares (par $5) of class A and 15,000 shares (par $1) of class B common stock outstanding at the close of the period. The report states that 86% of the earnings for the first half of 1936 were from second quarter operations. In the first half of 1935 net profit was $296,045.

	1936	1935
Operating profit	$569,852	$401,193
Depreciation and depletion	64,839	39,256
Balance	505,013	361,937
Other income	30,980	9,906
Total income	535,993	371,843
Bond interest	23,790	16,913
Federal income tax	65,000	38,000
Other deductions	38,821	20,884
Net income	408,382	296,046
Preferred dividends	135,220	*631,910
Surplus for period	273,162	(d)335,864
Earned per share, 1st pfd.	$11.63	$11.26
Earned per share, 2nd pfd.	11.34	8.10
Earned per share, class A:		
Priority basis	1.19	1.47
Participating basis	1.12	1.32
Earned per share, class B.	1.12	1.32

*Includes $541,660 on arrears.

Current assets as of June 30, 1936, including $1,624,372 cash and United States government bonds, amounted to $3,905,725 and current liabilities were $542,476, comparing with cash, United States government securities, etc., of $615,310, current assets of $1,855,904 and current liabilities of $334,524 on June 30, 1935.

Commenting on the dividend prospects of the Class A stock of National Gypsum, M. H. Baker, president, stated that the matter has been discussed by directors and that before the end of the year they expect to renew their consideration of the matter "in the light of estimated financial requirements of the business at that time and the new rates of taxation imposed by the Revenue Act of 1936."

◆ ◆ ◆

PEERLESS CEMENT CORP., Detroit, Mich., reports for the six months ending June 30, a net profit of $42,980. Current assets as of June 30 were $758,091 and current liabilities $105,332.

◆ ◆ ◆

ALPHA PORTLAND CEMENT CO., Easton, Penn., reports for the 12 months ending June 30:

	1936	1935
Net sales	$5,883,559	$4,632,058
Operating expenses	4,525,859	3,612,412
Depreciation and depletion	1,202,557	1,456,465
Operating profit	155,143	(d)436,819
Other income	145,357	220,632
Total income	300,500	(d)216,187
Income charges	41,270	48,233
Minority interest	(cr)677	(cr)8,173
Net profit	*259,907	(d)256,247
Preferred dividends	.....	58,334
Common dividends	644,600	483,450
Deficit for period	384,693	798,031

* No provision has been made for Federal income taxes or surtaxes on undistributed profits.

Current assets as of June 30, 1936, were $6,547,692 and current liabilities $628,536.

CANADA CEMENT CO., LTD., Montreal, Que., reports for the first eight months of its fiscal year, ending July 31, consolidated profits, before depreciation, bond interest and income taxes, $1,329,063, compared with $963,108 for the eight months ending July 31, 1935.

As of July 31, 1936, current assets were $4,122,022 and current liabilities $835,364.

The company has authorized the sale of $16,500,000 first mortgage bonds, bearing interest at 3% and 3½% for short term maturities, and 4½% for long term bonds. Proceeds will be applied toward redemption of all of presently outstanding 5½% bonds. As result of the financing, interest charges on first mortgage bonds will be reduced to $641,250 a year from $882,750. The outstanding bonds are callable at any time on 30 days' notice at 104 to November 1, 1937, inclusive, and thereafter at 103. The bonds are payable, principal and interest, in three currencies. The proposed new issue is payable in Canadian funds only.

◆ ◆ ◆

NORTH AMERICAN CEMENT CORP., Albany, N. Y., reports for 12 months ended June 30, 1936, net loss of $335,420 after taxes, depreciation, depletion, interest, etc., comparing with net loss of $292,225 for the 12 months ended June 30, 1935.

◆ ◆ ◆

CALAVERAS CEMENT CO., San Francisco, Calif., and subsidiaries, report for the years ending December 31:

	1935	1934
Gross profit from operations	$394,097*	$291,757
Interest and miscellaneous income	14,451	11,344
Total income	$408,548	$303,101
Selling, administrative and general expenses	227,565	178,687
Provision for depreciation and depletion	111,143	120,805
Experimental charges	.....	12,197
Provision for Federal income and capital stock taxes	12,910	.....
Net loss	prof$ 56,930	$ 8,589
Previous surplus	165,359	173,947
Total surplus	$222,289	$165,359
Preferred dividends	58,823	.....
Surplus, Dec. 31	$163,466	$165,359

* Arrived at as follows: Net sales, $804,179, less cost of goods sold, $410,082; gross profit from operations, $394,097.

◆ ◆ ◆

NATIONAL GYPSUM CO., Buffalo, N. Y., stockholders have approved the plan to purchase the assets of Atlantic Gypsum Co., by issuing 265,000 additional shares of class A stock, turning over 13,000 shares for part payment and retaining the remaining shares for future needs. A 4% mortgage will pay for the balance of the $2,000,000 purchase price.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of September 26.

New England

39748. To establish commodity rates on crude or ground feldspar, minimum weight 60,000 lb., Cold River, N. H., and Bates, Bath, Cathance and Topsham, Me., to stations in Trunk Line and Central Freight Association territories.

39774. Lime rock, minimum weight 80,000 lb., except that when cars are loaded to visible capacity actual weight will apply, from Warren to Woodland, Me. Proposed—11½c per 100 lb. Reason—To enable the Me. C. R. R. to receive a haul on this traffic.

39805. Clam shells, unground, minimum weight 50,000 lb., Rockland and Thomaston, Me., to Lowell, Mass. Proposed—16c per 100 lb.

39822. Sand and gravel, (See Note 1), except that when cars are loaded to visible capacity actual weight will apply, from Libbys Pit (Leeds Jct.), Me., to Rumford, Me. Proposed—65c per 100 lb. Reason—To enable the Me. C. to receive a haul on this material.

39843. Stone, natural, chips, crushed, dust, ground, powdered or waste, N. O. I. B. N., (See Note 2), Swanton, Vt., to 33d St., New York City (N. Y. C. R. R.) Proposed—21c per 100 lb. Reason—To establish reasonable rate from Swanton, Vt., to New York City, which will enable shippers to sell some of their product.

Trunk

34877 (Sup. 3). (As described in July and August issues, Rock Products) to Montreal, P. Q.

From	A-B-C	D
Hancock, Md.	$5.65	$5.88
Round Top, Md.	5.65	5.88

(Rates in cents per 2000 lb.)

35004 (Sup. 2). Slag, in bags, C. L., minimum weight 50,000 lb., from Niagara Falls, N. Y. Amended by eliminating from proposal all points of destination except Lockport and Niagara Falls to which rate of 75c is proposed, and to Rochester rate of $1.00 per net ton.

35143. To establish on stone, natural (other than bituminous asphalt rock), crushed, C. L. (See Note 2), from Arkville, N. Y., to points in N. Y. state, rates ranging from 75c to 105c per net ton.

35158. Crushed stone, C. L. (See Note 2), from White Haven, Penn., to Archbald, Penn., 110c per net ton.

35162. Stone, crushed, C. L. (See Note 3), from Shainline, Penn., to Moorestown, Pemberton, Beverly, Delanco, Palmyra and Burlington, N. J., $1, to Mt. Holly, Masonville, New Lisbon, Smithville and Columbus, N. J., $1.10 per net ton.

35166. Limsetone, ground or pulverized, C. L., minimum weight 60,000 lb. from Jamesville, N. Y., to points in New York state on the Erie R. R., N. Y. C. R. R., P. R. R. and Nickel Plate, rates ranging from 185c to 205c per net ton.

35168. Stone, crushed, C. L. (See Note 2), from Jamesville, N. Y., to Danville, Penn., 150c per net ton.

35175. Broken stone, C. L. (See Note 2), from Port Deposit, Md., to Norfolk, Va., $2 per net ton.

*Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity shipped, the shipper to so specify on shipping orders and bills of lading.

35183. Stone, crushed and screenings, in straight or mixed carloads, (See Note 2), from Jamesville, N. Y., to Pleasant Mount, Penn., $1.60; Lanesboro, Penn., $1.40; Hillside Jct., Penn., $1.50; Yatesville, Penn., $1.50 and Dunmore, Penn., $1.50 per net ton.

35184. Slag, uncoated, not ground or pulverized, in bulk, in open top equipment, C. L. (See Note 2), from Niagara Falls, N. Y., to stations in New York state on the L. V. R. R., rates ranging from 60c to $1 per net ton.

35186. Limestone, ground or pulverized, C. L., minimum weight 60,000 lb., from Niagara Falls, N. Y., to points in New York, Pennsylvania and New Jersey and the L. V. R. R., rates ranging from 60c to $3.45 per net ton.

35191. To publish on sand and gravel rates from Morris, N. J., to points in Trunk Line, C. F. A. and New England territories on same basis as is now published from contiguous points, viz., Birmingham, Ewansville, Hainesport, Lumberton, Masonville, Mt. Holly, Smithville and South Pemberton, N. J.

35199. Sand (other than ground or pulverized or naturally bonded molding), and gravel, in open cars without tarpaulin, C. L. (See Note 2), from Cuddebackville, N. Y., to Long Eddy, Hankins and Callicoon, N. Y., $1.20 per net ton.

35200. Slag, C. L. (See Note 2), from Durham, Penn., to Woodbine, N. J., $1.20, and Salem, N. J., $1.10 per net ton.

35218. Industrial Sand, in straight or mixed carloads (See Note 2), from Dunbar, Penn., to Hubbard, Ohio, $1.25 in open top equipment and $1.60 in closed equipment per net ton.

35226. Slate, dust, crushed and ground, C. L., minimum weight 50,000 lb. from D. & H. R. R. stations, 111 Fairhaven, Vt., to 113 Castleton, Vt., inclusive; 117 Poultney, Vt., to 120 West Pawlet, Vt., incl., to North Brookfield, Mass., 16c per 100 lb.

35230. Sand (other than ground or pulverized or naturally bonded moulding), and gravel, in open top cars without tarpaulin, C. L. (See Note 2), from Cuddebackville, N. Y., to West Mahwah and Ramapo, N. J., $1.20 per net ton.

Central

48020. To establish on (a) sand, naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding, ground or pulverized sand), in closed equipment, C. L.; (b) sand, ground or pulverized, in all kinds of equipment, C. L., and (c) sand (except naturally bonded moulding, ground or pulverized sand), and gravel, in open top equipments, C. L. (See Note 3), but not for closed and open top cars of less marked capacity than 60,000 and 80,000 lb. respectively. Rates in cents per net ton. To Cranston, R. I.: From Zanesville, O., group—(a), 460; (b) 501; (c) 460. From Oil City, Penn., group—(a), 410; (b), 440; (c), 410.

48061. To establish on core sand, C. L., from Vassar, Mich., group to Michigan City, Ind., 185c in open top cars and 200c per net ton in closed cars.

48091. To establish on agricultural limestone, unburnt, ground or pulverized, in box cars, in bulk or in packages, min. wt. 50,000 lb., from Piqua, O., to LaPorte, Ind., 185c.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

48109. To establish on crushed stone and stone screenings, in bulk, in open top cars, C. L. (See Note 3), from North Vernon, Ind., to Edinburg, Ind., 70c per net ton.

48111. To establish on slag, commercial, crushed in bulk, in open top equipment, C. L. (See Note 3), from Antrim, Mich., to Dunkirk, N. Y., 360c per net ton.

48116. To establish on crushed stone and crushed stone screenings, in bulk in open cars, C. L., from Waterville, O., to Defiance, O., 80c per net ton.

48117. To establish on crushed stone and stone screenings, in bulk, in open top cars, C. L., from Logansport, Ind., to Anderson, Ind., 70c per net ton.

48120. To establish on sand (except industrial) and gravel, in open top equipment, C. L., from Marion, O., to Shelby, O., 60c per net ton, to expire Dec. 31, 1936.

48127. To establish on limestone, C. L. minimum weight 60,000 lb., from Bedford, Ind., to Ford City, Penn., 235c per net ton.

48128. To establish on (a) Sand, naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding, ground or pulverized sand), in closed equipment, C. L.; (b) sand, ground or pulverized, in all kinds of equipment, C. L., and (c) sand (except naturally bonded moulding, ground or pulverized sand), in open top equipment, C. L. (See Note 3), but not for closed and open top cars of less marked capacity than 60,000 and 80,000 lb. respectively from Nashua, Penn. Proposed rates (in cents per net ton):

To	(a)	(b)	(c)
Sharon, Penn.	90	99	60
Youngstown, O.	100	110	70
Warren, O.	110	121	80

48169. To establish on sand and gravel, filter, in straight or mixed carloads, in box cars, from West Pittsburgh, Penn., to Poland, Penn., 160c per net ton.

48170. To establish on sand, industrial, C. L., (See Note 3), but not for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively, from Mahoning Valley and Western Junction, O., to various Ohio destinations:

Proposed rates in cents per net ton—Alliance, 60; Ashtabula, 110; Barberton, 60; Bellaire, 140; Berlin Center, 75; Cadiz, 120; Canton, 80; Columbus, 140; Coshocton, 130; Dennison, 100; Dover, 90; East Liverpool, 120; East Palestine, 90; Killbuck, 110; Leetonia, 80; Loudonville, 120; Lowellville, 85; Marietta, 140; Massillon, 90; Minerva, 85; Mt. Vernon, 140; Newark, 150; Niles, 80; Orrville, 90; Steubenville, 140; Strasburg, 90; Toronto, 140; Warren, 80; Warwick, 70; Wooster, 90; Youngstown, 80; Zanesville, 140.

48173. To establish on slag, commercial, crushed or granulated, in open-top cars, C. L., from Cleveland, O., to Erie, 100c; Harbor Creek and North East, Penn., 110c per net ton.

48184. To establish on limestone, ground or pulverized, unburnt, C. L., minimum weight 60,000 lb., from Greencastle, Ind., to points in Illinois, rates on the revised I. C. C. Docket 25220 basis.

48185. To establish on (a) sand, naturally bonded, moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding; ground or pulverized sand) in closed equipment, C. L.

(b) Sand, ground or pulverized, in all kinds of equipment, C. L.

(c) Sand (except naturally bonded moulding; ground or pulverized sand) in open top equipment, C. L. (See Note 3), but not for closed and open top cars of less marked capacity than 60,000 and 80,000 lb., respectively, from Ottawa, Ill., district to Madison, Ind. (a) 240c; (b) 264c, and (c) 240c per net ton.

48186. To establish on Sand, as described in 48185 from Ottawa, Ill., district to Columbus, Ind. (a) 230c; (b) 253c, and (c) 230c per net ton.

48187. To establish on stone, quarry waste, C. L., from Port Austin, Mich., to Berea, Ohio, 300c per net ton, to expire December 31, 1936.

48221. To establish on industrial sand, (See Note 3), from Dunbar, Penn., to Hub-

bard, Ohio, 125c in open top equipment and 160c per net ton in closed equipment, subject to emergency charges.

48240. To establish on (a) sand, naturally bonded moulding, in all kinds of equipment; sand (except naturally bonded moulding; ground or pulverized sand), in closed equipment; (b) sand (except naturally bonded moulding; ground or pulverized sand), in open top equipment, C. L. (See Note 3), but not for closed and open top cars of less marked capacity than 60,000 and 80,000 lb., respectively, from Brown's Siding, Ohio, and other points in the Southern Ohio Group to Port Austin, Mich., 270c per net ton.

48241. To establish on stone, crushed, slag or gravel, coated with oil, tar or asphaltum[2], in open top cars, C. L., from Sandusky, Ohio, to Bay City, 199c; Benton Harbor, 211c; Detroit, 153c; Flint, 188c; Grand Rapids, 211c; Kalamazoo, 199c; Lansing, 188c; Ludington, 268c; Owosso, 188c; Port Huron, 153c, and Saginaw, Mich., 199c per net ton.

48270. To establish on stone, crushed, C. L. (See Note 3), from Keeport, Ind., to Blissfield, Mich., 106c; Findlay, Fremont and Ottawa, Ohio, 120c per net ton.

48301. To establish on slag, crude, granulated, crushed or commercial, in bulk, in open top equipment or closed cars, in straight or mixed carloads, from Pittsburgh, Penn., to Superior, Ohio, 190c in open top equipment; 210c per net ton in closed cars, subject to emergency charge.

48319. To establish on crushed stone, C. L., from Keeport, Ind., to Tolono, Sadorus and Ivesdale, Ill., 63c per net ton to expire December 31, 1936.

48341. To establish on limestone, unburned, agricultural, C. L., from Spore, Ohio, to Austinburg, Ohio, 135c; Burton, Center Road, Chardon, Clarks, Concord, East Claridon, Ohio, 125c; Orangeville, Ohio, 135c, and Warren, Ohio, 125c per net ton.

48353. To establish on fuller's earth, C. L., from Olmsted, Ill., to Louisville, Ky., 420c, minimum weight 40,000 lb, and 320c per net ton minimum weight 70,000 lb., subject to Emergency Tariff 542-A.

Southern

Amdt. 1 to 12239. To suggest 502c net ton—slate, broken or crushed, C. L. (See Note 2), Bolivar, Ga., to York, Penn.

Amdt. 1 to 12291. Amended to also suggest 415c net ton—phosphate rock—N. C. & St. L. Ry., Centreville district stations to Shreveport, La.

12544. Establish 5th class—soapstone and soapstone products, in straight or in mixed C. L., min. wt. 24,000 lb., subject Rule 34 Sou. Classn.—points in S. F. A. territory to points in Southwest and Kansas-Missouri territory.

12563. Oyster shells, C. L., in Item 230, Emerson's Tariff 9-E. Establish to Owens Sound, Ont., from: Bayou La Batre, Ala., Berwick, La., Biloxi, Miss., Gulfport, Miss., Houma, La., Mobile, Ala., Morgan City, La., New Orleans, La., Pensacola, Fla., 51c; Apalachicola, Fla., 55½c cwt.

12592. Limestone, ground or pulverized, minimum weight 67,000 lb., C. L. Cancel, as obsolete, 162c per net ton, Calera, Ala., to Mobile, Ala., for export. Domestic rate to apply.

12629. Wool, mineral (rock or slag wool), plain or saturated, loose or in packages, C. L., min. 24,000 lb., subject to Rule 34. Establish 53c cwt., Rockdale, Tenn., to Minneapolis, Minnesota Transfer and St. Paul, Minn.

12631. Refuse, limestone screenings, C. L., min. 100,000 lb. Establish from Tyrone, Ky., to Harrodsburg, Ky., 35c; to Shelbyville, Ky., 40c net ton. Truck competitive.

12644. Phosphate rock and phosphatic limestone, C. L. Extend expiration date on rates from L. & N. R. R. and N. C. & St. L. Ry., Mt. Pleasant-Centreville district stations in L. & N. R. R. Tariff GFO 44D to lake ports, viz.: Buffalo, N. Y., Chicago, Chicago Heights, Ill., Detroit, Mich., Cleveland, Sandusky, Toledo, O., and to inland ports, viz.: Joliet, Ill., and Lansing, Mich., from Dec. 31, 1936, to Dec. 31, 1937.

12656. "A"—limestone, crushed or ground, in paper lined burlap bags or barrels, straight or mixed C. L., min. 60,000 lb.: "B"—marble, crushed or ground, in paper lined burlap bags or barrels, straight or mixed C. L., min. 60,000 lb. Establish from Cartersville, Ga., to South Atlantic ports for transshipment to Pacific coast via Panama Canal, 201c net ton on "A" (limestone) and 207c net ton on "B" (marble), to include shipside delivery. Expires Dec. 31, 1936.

12694. Mica, scrap, suitable for grinding purposes only, C. L., min. 60,000 lb. Establish 550c net ton. Rocky Mount, Va., to Forest Park (Chicago), Ill.

12705. Limestone, ground to fineness to pass through 4/16-in. mesh (not in open top equipment), C. L., min. 60,000 lb. as to 230c of through rate and 40,000 lb. as to the remainder. Establish 446c net ton—Cartersville, Ga., to Kansas City, Mo. Expires Dec. 31, 1936. Rate of 490c to apply after Dec. 31, 1936.

12719. Flintstone, ground, C. L., minimum 60,000 lb. Establish rates from Erwin, Tenn., Spruce Pine, Minpro, Toecane, Bowditch and Cane Branch, N. C., to Atlanta, Ga., Birmingham, Ala., Charleston, S. C., Jacksonville, Fla., Knoxville and Nashville, Tenn., the same as on feldspar in C. C. & O. R. R. I. C. C. 129.

12721. Restore former rate of 25c cwt., from Johnson City, Tenn., and Clinchfield R. R. stations in Group 5, Note 40, C. C. & O. Ry., Clay, Mineral and Ore Tariff 13, and rate of 27c cwt. from Black Mountain Ry. stations in Groups 6 and 7 to Cincinnati, Ohio, and group on mica, dry, ground, C. L., minimum 60,000 lb. Also restore rate of $4.28 net ton on mica schist, from Huntdale, N. C., and Clinchfield R. R. stations in Group 4, Note 40 of tariff to Cincinnati, Ohio, and group.

12730. Mica, dry ground, C. L., min. 60,000 lb. Establish to Cincinnati, Ohio, from Asheville, Biltmore, N. C., Johnson City, Tenn., 25c; Franklin, N. C., Kings Creek, S. C., 27c; Balsam, N. C., 29c cwt.

12785. Vermiculite, exfoliated, C. L., min. 16,000 lb., subject to Rule 34. Establish 6th class rating—between points in S. F. A. territory and between points in S. F. A. territory and points in Official (including I. F. A.) territory. Truck competitive.

Western

Sup. 1 to E-155-3. Fluorspar, crude or ground, C. L., minimum weight 80,000 lb., from Northgate, Colo., to East St. Louis, Ill., and St. Louis, Mo. Proposed, $6.60 per ton of 2000 lb. Note—Proportional rate, applies only on traffic destined to points east of the Illinois-Indiana state line. Rate is to be made subject to emergency charges.

Sup. 1 to D-43-28. Stone, from Sacred Heart, Ortonville, Minn., and Milbank, S. D., to Lindsborg and McPherson, Kan. Proposed—55c per 100 lb.

E-43-29. Granite or marble, rough quarried or sawed, C. L., minimum weight 40,000 lb., from Elberton, Ga., to Fort Scott, Kan. Proposed, $6.85 per ton of 2000 lb., subject to emergency charges.

D-41-180. Stone, artificial and natural, building and monumental (except carved, lettered, polished or traced), curbing, flagging and paving stone: Granite or stone curbing and paving blocks, straight or mixed carload, min. wt. 40,000 lb., from Silverdale, Kan., to Lincoln, Neb. Proposed, 16c per 100 lb.

C-41-181. Sand and gravel, C.L., coated with tar and asphalt (See Note 3), but not less than 60,000 lb. from Ottawa, Ill., to Golden, Colo. Proposed—$7 per net ton.

D-41-182. Roofing granules, from Jedburg and Pacific, Mo., to Boston, Mass., and points taking Boston rates. Proposed—$5.80 per net ton. Minimum weight 80,000 lb.

Southwestern

9138. To establish rate of $4.20 per ton of 2,000 lb. not subject to emergency charge on silica, carloads, minimum weight 90,000 lb., from Rogers, Ark., to Beverly, Tex.

9156. To establish rates of 26c to Kansas City, Mo., 42c to St. Louis, Mo., and 48c per 100 lb. to Chicago, Ill., from Cache, Cold Springs, Mountain Park and Roosevelt, Okla., on dressed stone, carloads, minimum weight 36,000 lb.

9321. Stone, rough quarried, Cold Springs, Okla., to Bowie, Tex. To establish 10c per 100 lb., minimum weight 50,000 lb.

9357. Establish on crushed stone, asphalt coated and/or plain, straight carloads, subject to present minimum weights and to expire December 31, 1936, a rate of 93c per ton of 2000 lb. from Stringtown, Okla., to McKinney and Arbuckle Switch, Tex.

9393. Establish a rate of $1.35 per net ton on limestone, carloads, minimum weight as authorized in Item No. 60, S. W. L. Tariff No. 162-K, from Neosho, Mo., to Kansas City, Mo.-Kan.

Illinois

7100-G. Road building material, viz., sand, gravel and crushed stone, between I. R. C. points.

To reduce all rates on sand, gravel and crushed stone somewhere between 33 1/3% and 40%, or as alternative, reduce present:

40c rates to 35c	95c rates to 65c
50c rates to 40c	$1.00 rates to 70c
60c rates to 45c	$1.01 rates to 70c
65c rates to 45c	$1.05 rates to 75c
70c rates to 50c	$1.13 rates to 80c
76c rates to 50c	$1.20 rates to 90c
80c rates to 60c	$1.26 rates to 90c
88c rates to 60c	

Disregarding present differentials which happen to exist.

7458-1. Sand and gravel, C. L., usual minimum weight, from Lincoln, Ill., to Andres, Ill. Proposed—$1.01 net ton.

7601-E. Granules, roofing, consisting of crushed or ground brick, gravel, slate, stone and/or clay or shale, straight or mixed C. L. Minimum weight 60,000 lb. in connection with rate of $1.90 per ton from Danville, Ill., to Marseilles, Ill. Note—Rule 24 of Official Classification not to apply. (b) Granules, roofing (consisting of granulated brick and/or clay or shale). (See note 2), but not less than 60,000 lb. From Danville, Ill.

To	Proposed
Marseilles, Ill.	$1.45 net ton
Waukegan, Ill.	1.70 net ton

8325. To cancel rating of 80% of 6th class as published in Item 3880 of Agent Jones' Tariff 130-X, on fuller's earth, C. L., minimum weight, 40,000 lb., permitting classification basis of Class 25 rating, to apply in lieu thereof, between I. R. C. points.

S. F. A. 3285. Granite curbing, paving stone, and flagging, minimum 60,000 lb. Establish 25c cwt., Lithonia, Ga., group, Elberton, Ga., group, and Mt. Airy-Granite Quarry, N. C., to Chicago, Ill., Cleveland, Ohio, Detroit, Mich., Toledo, Akron, Dayton, Ohio, Indianapolis, Ft. Wayne and South Bend, Ind.

To Revise Chicago Rates

Proposals to revise the rates on sand, crushed stone, gravel, and slag into the Chicago market from zone 1 origin points in Illinois, and to reduce the switching rates on those commodities within the Chicago switching district were put in the record at a hearing before Examiner J. Edgar Smith at Chicago September 16. The railroads requested reduction of rates from zone 1 from 65c for a one-line haul and 85c for a multiple-line haul to 40 and 60c, respectively. Instead of the switching rates of 3, 3½ and 4c a hundred pounds for one, two and three-or-more line hauls, the railroads asked to be permitted to make tonnage rates of 35, 45 and 55c.

Slag Rate Change Delayed

The Interstate Commerce Commission recently suspended until April 15, 1937, a proposed new schedule of rates on road building slag from Alabama to points south of the Seaboard Air Line Railway from Jacksonville to River Junction, in Florida. Meanwhile, old rates will remain in effect.

Nebraska Rates Vacated

The Nebraska Railway Commission has vacated a recent order designed to aid Nebraska railroads combat sand and gravel rates fixed by motor truckers but which in reality "froze" the rail carriers' rates so that no emergency changes were possible. The order had generally reduced sand and gravel rates from Platte river points to Omaha but allowed for no reductions in any specific case, so that a current paving job at the Omaha Municipal airport for hauling 1100 cars of sand and gravel went to a trucking firm.

I. C. C. Decisions

22109. Sand, Gravel, Crushed Stone, etc., within South Carolina. By the Commission. Seventh supplemental report. Findings in prior reports further modified so as to exempt from the provisions thereof the intrastate movement, sand, carloads, Pon Pon, S. C., to Charleston, S. C. The modification was made so as to permit the Atlantic Coast Line to establish a rate of 50c a net ton from Pon Pon to Charleston (bearing expiration date of December 31, 1936), thus keeping traffic for the railroads from a barge line.

27312. Colonna & Co., Inc., vs. Pennsylvania et al. By division 2. Charges, carload, crushed stone, Phillipsburg, N. J., to Miami, Fla., unreasonable to the extent they exceeded those which would have accrued on a rate of 36c and a minimum of 54,000 lb., plus 1c emergency charge. Shipment was made in August, 1935. Reparation of $133.20, with interest, awarded.

New Dredge

ARKHOLA SAND AND GRAVEL CO., Van Buren, Ark., has launched a new steel dredge in the Arkansas River near Van Buren. The hull is 70 ft. long, 26 ft. wide and 54 in. deep, and weighs 70 tons, equipped. Equipment includes a 300-hp. motor and 10-in. pump, with maximum pumping range of 1,500 ft. It was built by the Nashville Bridge Co., Nashville, Tenn. R. L. Reed is manager of the Arkhola company.

Concrete Pavement Yardage

AWARDS of concrete pavement for August, 1936, were announced by the Portland Cement Association as follows:

Type of Construction	Sq.yd. awarded during Aug., 1936	Total sq. yd. for year to date, Aug. 29, 1936
Roads	4,648,321	24,378,730
Streets	1,208,672	9,421,674
Alleys	46,253	254,176
	5,903,246	34,054,580

Would Expand Activities

GREAT EASTERN GRAVEL CORP., Bay Shore, N. Y., has petitioned local authorities for permission to increase its dredging area. The corporation now has a five-year agreement, granted three years ago by the town of Brookhaven, under which a royalty of five cents a cubic yard is paid for sand and gravel dredged from the harbor in an area south of the west breakwater. The corporation is now asking permission to extend its dredging operations to the southerly end of the harbor and into Setauket Harbor.

Damage Suit

TRI-COUNTY SAND CO., Seminole, Okla., has been sued for $25,000 damages on account of the accidental death of an inexperienced truck driver, as described in ROCK PRODUCTS, August, 1936, p. 65. The petition of the parents alleges that "the hydraulic dumper on the truck stuck while half of a load of sand was in it, and when the young driver reached under the truck for a shovel the dumper suddenly fell on him, taking his life."

At the time of the accident it was reported that the driver reached under the uplifted truck body to release the catch—a violation of all safety rules and of common sense.

Roadside Commercial Plant

CALDWELL STONE CO., Danville, Ky., started operation of a new small plant at Boonesboro, Ky., in 1935. A quarry opened in 1930, originally to supply aggregate for several bridges, was reopened. The deposit contains rock having a chemical analysis of 98.7% $CaCO_3$, and is being worked on a 100-ft. face in benches. The plant was built on the bank of the Kentucky River about 200-ft. from the face being worked.

One 3-yd. truck hauls the rock to the crushing plant, and when this was written, 8 or 10 other trucks hauled the processed rock to county jobs. A 1-yd. Northwest gasoline-driven shovel loads the truck, which end-dumps to a Good Roads Machinery Co. 10-x40-in. primary jaw crusher, driven by a 50-hp. General Electric motor.

The crushed rock is carried to a 3x12-ft. double-deck Symons screen by a Columbus bucket elevator, 35-ft. centers. The screen is driven by a 3-hp. General Electric motor. Oversize rock passes to a No. 7270F Traylor gyratory secondary crusher, driven by a 30-hp. General Electric motor. After sizing, the rock passes to small bins below, which load directly into trucks. An 80-ft., c. to c., 14-in. Columbus belt conveyor, operating on a pivot, to permit a swing upward and downward, is provided to take rock from the bins to river barges below. Rock has been shipped as far as 100 miles by barge. The capacity of the plant is approximately 400 tons daily.

New small plant of Caldwell Stone Co., Boonesboro, Ky.

Cement Plant for Burma

BURMA CEMENT CO., LTD., Thayetmyo, Upper Burma, has recently been organized with a capital of 3,500,000 rupees, divided into 350,000 shares of 10 rupees each, of which 277,500 shares of similar denominations have been allotted to Steel Bros. & Co., Ltd., London; the Cement Marketing Co. of India, Ltd., Bombay; the Indo-Burma Petroleum Co., Ltd., Rangoon; and the Tunnel Portland Cement Manufacturers, Ltd., London, and its nominees. Forty thousand shares at 10 rupees each are now being offered for public subscription.

As far as the interests of Burma are concerned, the Burma Cement Co., Ltd., is not included in the merger of the Indian companies, but those companies, through the Cement Marketing Co. of India, Ltd., hold an interest in the Burma Cement Co., Ltd., and the terms of the merger include an agreement by the Indian cement companies to sell to the Associated Cement Companies, Ltd., their respective holdings in the Burma Cement Co., Ltd., at the nominal fully paid price of the shares. As the amalgamated cement companies have subscribed for shares in the Burma Cement Co., Ltd., rateably, the sale of the shares at their nominal fully paid price, notwithstanding that the shares are now at a premium, the arrangement is considered fair and equitable. It is felt that this substantial interest in the Burma Cement Co., Ltd., will be of mutual interest in eliminating any element of competition, and both companies will therefore work for the general advancement of the industry. It is apparent that with this association the local company will benefit very greatly from the experience and support of the very great organization in India.

The fuel for the operation of the company plant at Thayetmyo will be natural gas, which is piped from two gas wells owned by the Indo-Burma Petroleum Co., Ltd., Rangoon, and a further future source has been arranged. In India coal is utilized. The company limestone and clay deposits embrace an area of 215 acres.

Construction of the new company cement plant on the Irrawaddy River, is progressing rapidly with the view of placing the cement on the market at the earliest practicable opportunity. As an indication of local confidence in the new company, shares are reported reliably as having doubled in price. The company plant, it is also reported reliably, will be capable of satisfying Burma's demand for cement which, in view of the increasing general popularity of concrete construction, both public and private, in the larger coastal and inland residential and commercial centers, should increase materially with the gradual return of favorable economic conditions in this Province. (Consul Winfield Scott, Rangoon, July 13, 1936.)

To Add Storage and Packing Facilities

UNIVERSAL ATLAS CEMENT CO., Chicago, Ill., announces that construction of 12 reinforced-concrete storage silos holding over half a million sacks of cement and nearly doubling present storage capacity, and of a new electrically operated packing and sack handling plant that will increase present facilities by 50%, will begin shortly at the Independence, Kan., plant. C. M. Carman is plant superintendent.

Each of the silos will be 80 ft. high and 26 ft. diam. They will provide the extra storage space needed for special types of cement required on certain highway and other projects. A compressed air-pump, electrically driven, will convey cement from the mill to the storage silos at the rate of twenty sacks a minute. A screw conveyor system powered by electric motors will carry cement as required from storage to the new packing plant for sacking and delivery to nearby cars.

Adding Heat Recuperators

DEWEY PORTLAND CEMENT CO., Dewey, Okla., is installing a Vanderwerp recuperator on one 9½-ft.x155-ft. dry-process kiln.

• • •

DIAMOND PORTLAND CEMENT CO., Middlebranch, Ohio, is installing Vanderwerp recuperators on its two 10-ft. x150-ft. dry process kilns.

• • •

KOSMOS PORTLAND CEMENT CO., Kosmosdale, Ky., is installing new Vanderwerp recuperators on four 7-ft.x100-ft. dry process kilns.

Special Cements

OKLAHOMA PORTLAND CEMENT CO., Ada, Okla., is now manufacturing a masonry cement and a fibred cement for "drilling mud" and for lining oil wells. In other respects this plant is one of the most modern of the wet-process type, using slurry filters, up-to-date clinker coolers, and is even recovering flue gas to make dry ice, or solid CO_2.

Busy Season

MANITOWOC PORTLAND CEMENT CO., Manitowoc, Wis., is reported to be manufacturing 100,000 bbl. of cement per month, with a small stock on hand. It is anticipated production will be maintained until January, 1937; for the past few years production has ceased in November.

Grinding Development

DEWEY PORTLAND CEMENT CO., Dewey, Okla., plant is reported to be installing new Bradley Hercules mills as preliminary grinders for clinker ahead of the tube mills. Two-stage grinding, with air separation, is being extensively adopted in the cement industry.

• • •

TRINITY PORTLAND CEMENT CO., Eagle Ford, Tex., plant is installing Bradley Hercules mills for preliminary clinker grinding.

August Statistics

PORTLAND CEMENT INDUSTRY in August produced 12,535,000 bbl., shipped 12,560,000 from the mills, and had in stock at the end of the month 18,950,000. Production and shipments showed increases of 73.3 and 55.0%, respectively, as compared with August, 1935. Stocks at mills were 15.5% lower than a year ago.

The statistics here given are compiled from reports for August, received by the Bureau of Mines, from all manufacturing plants except six, for which estimates have been included in lieu of actual returns.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 160 plants at the close of August, 1936, and of 162 plants at the close of August, 1935.

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	August 1935	August 1936	July 1936	June 1936	May 1936
The month	31.8	56.2	51.3	52.3	48.9
The 12 months ended	27.4	36.1	34.0	32.7	31.6

May Resume Operation

VULCANITE PORTLAND CEMENT CO., Phillipsburg, N. J., according to local reports, may resume operation of its Alpha plant early next year, after several years' shutdown. This plant is one of the oldest in the industry; it has 15 dry process kilns, eight 125 ft. long and seven 60 ft. long.

Installs Air Separators

LONE STAR CEMENT CO., New York, Hudson, N. Y., is installing two 16-ft. Bradley air separators in its clinker grinding department.

Operating Chief

BESSEMER LIMESTONE & CEMENT CO., Youngstown, Ohio, announces the election of G. G. Treat, former secretary-treasurer, to the office of vice-president and treasurer to succeed Chas. Schmutz, president, who died August 15. He will be the executive officer in charge of operations.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Standard and Special Units by Vibration

Fine Residences Have Been Built of "Studblock" and "Slumpblock." Provision Made for Reinforcing Rods

A few of the standard sizes and shapes of "studblock"

STUDBLOCK is the trade name of a building unit manufactured by the Graystone Tile Co., North Hollywood, Calif. It is of the type that lays up to leave spaces through which reinforcing rods are run and then grouted in. Reinforcing is demanded for certain classes of structures by California building laws and ordinances, whether the building be of brick, concrete tile or monolithic concrete. The necessity for this was made apparent by the experience of earthquake shocks in several parts of the state. It is increasingly becoming a feature, and should always be used in those parts of the country where high winds prevail.

"Studblock" is made in dimensions adapted to any wall from 4-in. to 12-in. thickness, using single units, and in lengths of 12 and 24 in. But every unit contains two air spaces for insulation, as well as for lightening the weight, and the narrow spaces through which the insulation rods run. The dimensions and weights are:

Size	Thickness	Width	Length	Weight
4-in. Tile	3⅝	3¾	12	10
6-in. Tile	3⅝	5¾	12	13½
8-in. Tile	3⅝	7¾	12	18½
12-in. Tile	3⅝	12	12	24
24-in.	3⅝	12	12	39

The corners are made by having one closed-end and one short block. Foundations are poured to comply with local building requirements, and beams are poured over lintels and at the top of the walls, reinforced by horizontal rods. The structure has all the advantages of reinforced monolithic concrete at a less cost for ordinary dwellings and the smaller types of business buildings.

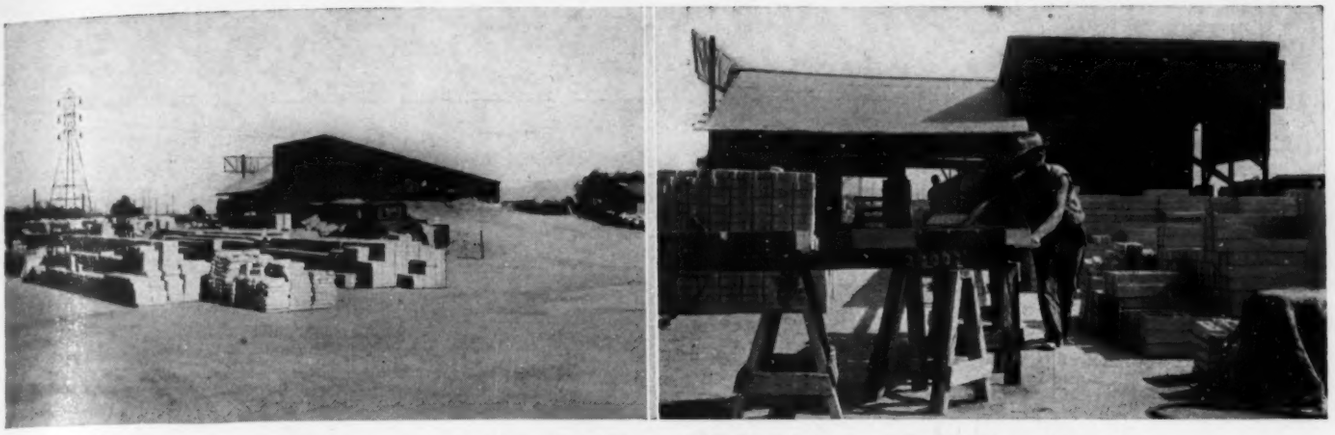
The company makes another building unit called "Slumpblock" which makes a wall of rough exterior surface that has "character." Such a wall has a pretty pattern of shadows in the sunlight, and its roughness emphasizes it and causes it to stand out from ordinary buildings. In both these blocks, light weight aggregate may be used.

Manufacture

These units, and all standard blocks and tile, are made on a special machine perfected by Stephan H. Flam. A very simple and effective plant may be constructed at a reasonable cost for the use of the machines. The aggregates are received by truck and elevated to bins, from which they can flow to the mixer by gravity. Cement is received in sacks. Either a one- or a two-sack mixer may be used. The mixed concrete is discharged on an octagonal table, with sides to prevent spills, and hoed by hand into the mold. This rests on a frame of hardwood which vibrates 3200 times a minute, and the vibration packs the mixture solidly and sends it into all corners, making a strong unit, uniform in every part. The mold is struck off and then swung over a table. It hangs in a yoke so that it is easily turned upside down to discharge the blocks on a pallet. This is taken away

This form, called "slumpblock," makes a wall that has character

LEFT—"Studblock" residence of Mr. Schulze, manager of the Graystone Tile Co. The entrance is of "slumpblock." RIGHT—A wall showing the fine appearance of "slumpblock"



LEFT—Plant and yard of Graystone Tile Co. RIGHT—Gravity conveyor in curing area

by the off-bearer, and the mold is swung back and filled again.

The production is 600 per hour for the 4-in. tile and 100 for the 12x24-in. tile. It is 300 for the standard 8-in. tile. A 1-hp. motor gives sufficient power. To change molds, one is lifted out of the yoke and another set in.

Although the machine has never been generally advertised, sales have been made to those who have heard of it and appreciated its efficiency and the simplicity of the plant.

The office of the company is at 11852 Sherman way, North Hollywood. J. W. Schulze is the principal owner and manager of the company.

Concrete Products Plant Enlarged

BOWSER SALES & TRADING CORP., Woodsfield, Ohio, has recently completed installing a new improved Miles automatic, electric operated, concrete block machine, at its Paden City cement products plant, replacing equipment that had been in operation for a number of years. The Bowser corporation manufactures concrete blocks for sale as well as for use in its contracting department. It now has under construction more than 25 new homes in the territories where it operates.

Expands Operation

FORT WORTH SAND AND GRAVEL CO., Fort Worth, Tex., has increased its ready-mixed concrete department by addition of seven new Jaeger 2-yd. transit mixers, which makes 20 trucks in all. The Fort Worth Exposition has helped the demand.

Barytes Promotion

WESTERN BARIUM CORP., San Francisco, Calif., has taken over the assets of the Paso-Baryta Mines, Ltd., whose principal property is a barytes deposit in Tulare county, California. It is proposed to build a new reduction and refining plant.

New Concrete Brick Plant

AUGUSTA BRICK AND TILE CO., Augusta, Ga., has recently leased a new concrete brick plant at Hamburg, S. C., across the river from Augusta. It is owned and operated by L. O. McWatty, Augusta, and J. P. Rabun, Stapleton, Ga. The capacity is 18,000 brick per day. The sand is purchased from local producers.

Resumes Production

BEE RIDGE CONCRETE PRODUCTS CO., Sarasota, Fla., has recently renewed production after a shutdown since 1929. A new large Besser block machine has been installed. S. P. Johnson, Sarasota, and A. F. Scura are owners. Mr. Scura is manager. A full line of concrete products is made.

Rebuilt

SOUTHERN ROCK ASPHALT CO., Dougherty, Okla., has completely rebuilt its crushing plant, destroyed by fire last June. The new plant has a capacity of 115 tons per hour.

Black Top Plant

PITTSBURGH ASPHALT PRODUCTS CO., Buffalo Valley, Penn., has recently completed a new plant for preparation of crushed-stone, asphalt-treated, paving mixtures, near the plant of the Pittsburgh Limestone Co., whose stone will be used.

Block-Top Plant

SERVTEX MATERIALS CO. has recently installed an asphalt plant at its New Braunfels, Tex., plant, to produce all types of cold and hot asphaltic mixes. The capacity of the plant will be 20 to 25 tons per hour.

Expansion

READ PHOSPHATE CO., Savannah, Ga., has purchased the local factory of G. Ober & Sons Co., fertilizer products, and will make improvements.

Prospecting for Cement Materials

LEMONT, PENN., a small town in Centre county near State College, is being prospected by an unnamed Eastern cement manufacturer as the possible site for a new plant, according to local reports. Limestone and shale are said to exist in abundance in this locality.

Sand-Lime Brick Production and Shipments

THE following data are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada. They may be considered representative of the industry.

Eleven active sand-lime brick plants reported for the month of August, this number being one more than that reporting for the month of July, statistics for which were published in September.

Average Prices for August

Shipping Point	Plant Price	Delivered Price
Pontiac, Mich.	$11.00	$13.50
Detroit, Mich.	....	13.50
Mishawaka, Ind	9.25	....
Syracuse, N. Y.	14.00	16.00-20.00
Saginaw, Mich.	10.50	....
Sioux Falls, S. D.	12.00	....
Madison, Wis.	11.00	13.00
Watertown, Mass.	....	12.50
Toronto, Ont., Can.	12.00	13.50

Statistics for July and August

	July†	August*
Production	3,427,225	3,920,777
Shipments (rail)	197,000	201,000
Shipments (truck)	2,896,015	3,376,859
Stocks on hand	1,811,768	1,939,036
Unfilled orders	2,100,000	1,540,000

† Ten plants reporting; incomplete, three not reporting unfilled orders.

*Eleven plants reporting; incomplete, four not reporting unfilled orders.

Sand-Lime Block

Two producers, in Michigan and Canada, reported production of a total of 77,100 sand-lime block in August, with truck shipments aggregating 64,861. Prices of the block averaged 10½c at the plant and 13c delivered, in Canada. The Michigan prices were 12c for 8x8x16 block and 16c for 8x12x16 block, delivered.

NEW MACHINERY AND EQUIPMENT

Small Excavator

HARNISCHFEGER CORP., Milwaukee, Wis., has added to its line of P&H excavators a high-speed ¾-yd. machine designated model 355. It is built of the new high tensile steels by electric welding, saving weight over its predecessor of similar capacity. It has standard tractor crawlers made by Allis-Chalmers Manufacturing Co.

Greater ease of control is claimed through the use of automotive-type foot pedals which permit the operator to make natural use of his strength. Larger brakes and clutches are provided for faster starts and stops as well as easier spotting of the dipper.

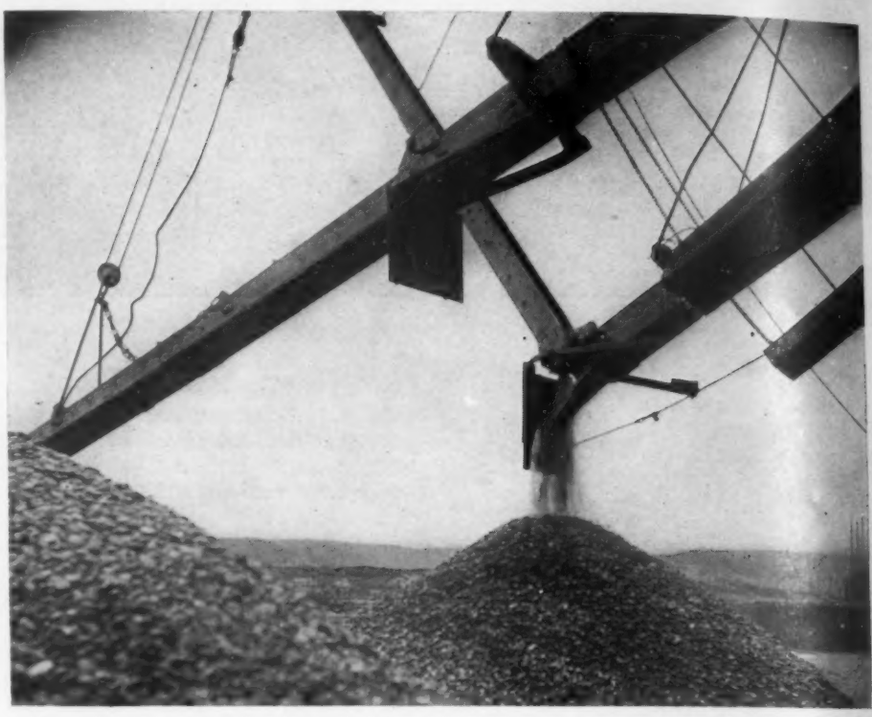
High-speed ¾-yd. excavator

Following out the idea of reducing all possible weight on the front end to put more material in the dipper, the model 355 has an all-welded dipper made of rolled steel, with ¾-yd. struck measure capacity. The removable dipper teeth, of full manganese steel, are reversible.

The model 355 is available with light alloy steel attachments for service as shovel, dragline, crane, skimmer scoop, trench hoe and pile driver.

Rubber Liners

B. F. GOODRICH CO., Akron, Ohio, calls attention of rock products operators to the constantly increasing number of uses for "Armorite," a soft elastic rubber possessing a tensile strength of approximately 4000 lb. per sq. in., furnished in sheets, strips or rolls with a fabric backing of sufficient stiffness to provide a suitable anchorage for bolt, screw or nail heads. It can be used for abrasion protection against wet or dry materials; can be attached with mastic tar or Goodrich Plastikon cement, in light service.



Rubber-covered baffle plates used on a sand and gravel river dredge, said to outlast steel 10 to 1

By means of the "Vulcalock" process of attaching rubber to metal, Armorite is also available in sheet form with steel backing, in different thickness and on various gauges of steel. Because the Vulcalock process does not require the use of a hard rubber insertion, these sheets can be cut, drilled or bent without injury to the protective rubber covering or the adhesion. In addition to steel, Armorite can be vulcanized to black iron, blue annealed sheets, aluminum, stainless steel and certain compositions of brass.

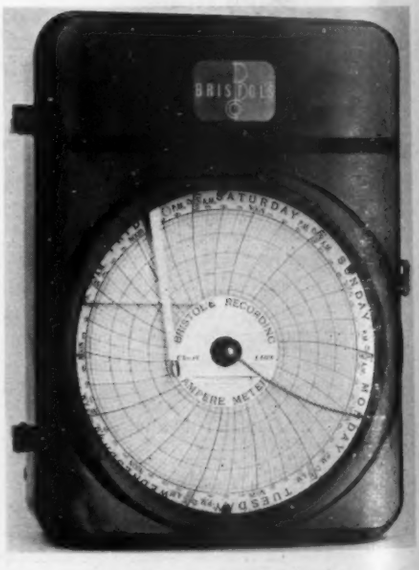
The most commonly used thickness of this rubber lining is ¼ in., but for light abrasion with no impact ⅛ in. is satisfactory. Its use in thicknesses over ¼ in. is governed by such factors as height of drop, size of largest lumps, sharpness and weight of material, angle of chute and amount of liquid. Armorite should not be used in contact with oils or in temperatures exceeding 150 deg. F.

As a lining for chutes, launders, hoppers and other wearing surfaces handling sand or gravel, Amorite is claimed not only to have demonstrated its economy in greatly prolonging equipment life but also to have served to eliminate excessive noise.

Recording Instruments

BRISTOL Co., Waterbury, Conn., in the past few months has introduced a new line of standard recording instruments, illustrated herewith.

Electrical: Voltmeters and ammeters in wall, switch board, flush panel, for pole mounting and portable, in moisture, fume and dust proof cases made of aluminum alloy, with spring-driven and electric Telechron clocks.

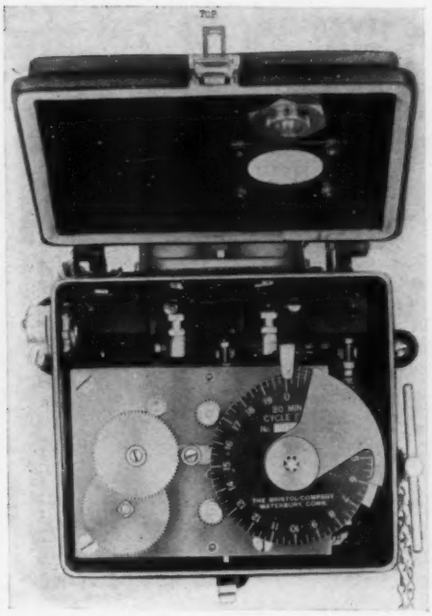


Ammeter in dust-proof case

Temperature: New, gas-filled, recording thermometer, with a small temperature resistive bulb for long lengths of connecting tubing for measuring temperatures between —60 deg. F. and 1000 deg. F.

A series of pneumatic-type controllers known as "Ampliset free-vane," for automatically controlling temperature, time-temperature, flow, liquid level, pressure, time-pressure, and humidity. The Ampliset principle has also been combined with the "Metameter," a system of telemetering recently announced by this company, for the remote control of steam pressure and gas pressure.

Process Control: A new process cycle controller, known as the model 6088V, to fulfill the many requirements where a variable-speed controller is required;

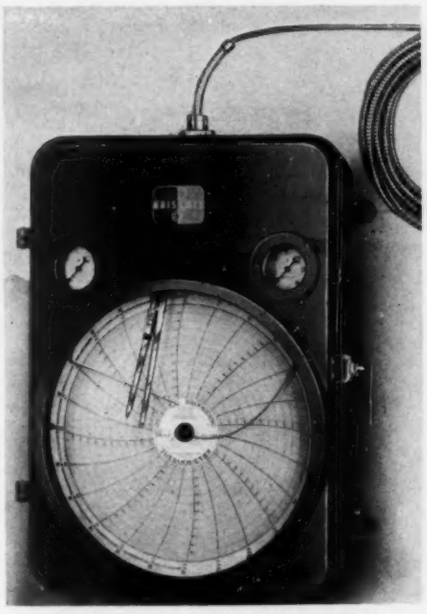


Controller for variable cycle speeds

suitable for automatically controlling any cycle operation.

"Master" free-vane controllers similar to above, designed primarily to take care of more severe conditions encountered in processes, such as sudden load changes, over-shooting, etc.; to automatically compensate for each of the disturbing elements in industrial processes that, from time to time, have a tendency to upset the true function of the control system; makes it possible to obtain precision control on extremely difficult applications without assistance from the operator.

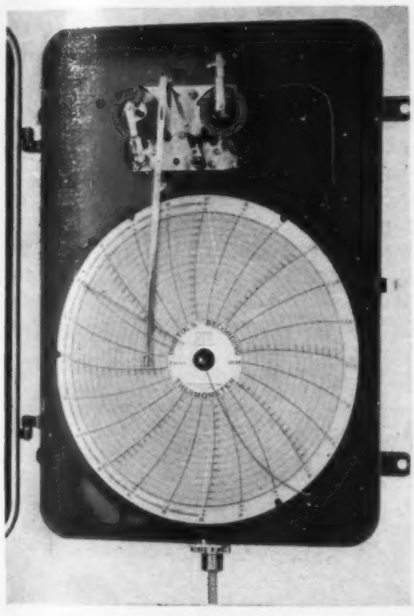
Pneumatic-type controller for temperature, pressure and liquid level, known as model 90; designed to take care of the many requirements for automatic temperature and pressure control that do not warrant a chart record of the controlled temperature or



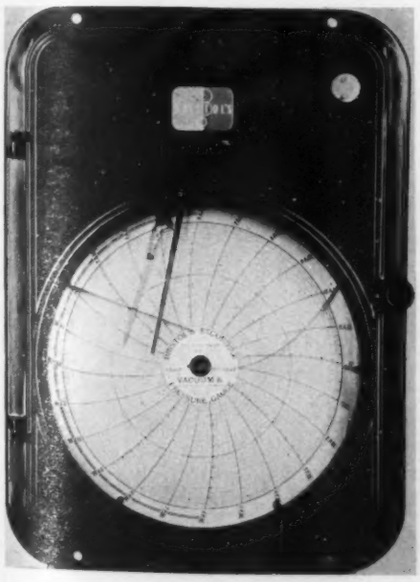
Pneumatic type controller for temperature

pressure, and for applications where recording instruments already are in use.

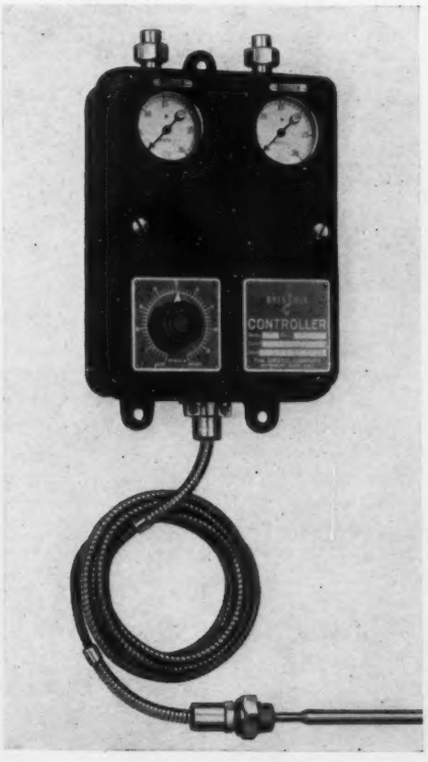
A series of low-range recording gauges and controllers, known as the model D40M; equipped with enclosed bell-type measuring elements, for draft or pressure in minimum ranges of 0 to 0.2 in. of water and maximum ranges of 0 to 2.0 in. of water.



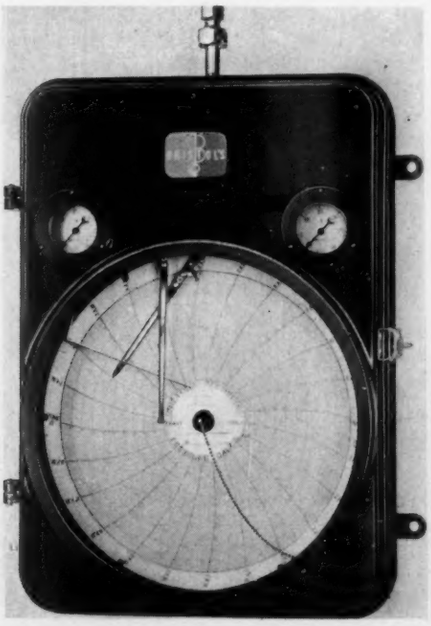
Gas-filled thermometer



Master free vane vacuum and pressure gage



Ampliset controller



Recording pressure gage

Recent Developments in Earth Movers

Scraper for Many Uses

Garwood Industries, Inc., Detroit, Mich., has placed on the market the Garwood hydraulic scraper used with a suitable tractor for excavating, hauling and placing material, stripping sand and gravel deposits, quarries, etc.; claimed that one operator can handle 500 to 1000 cu. yd. per 8-hr. day.

Scraper which handles 500 to 1000 cu. yd. in 8 hours

The "Wagon-Scraper"

Continental Roll & Steel Foundry Co., East Chicago, Ind., has announced a 10-yd. "Wagon-Scraper," known as model CS10A, for use with 75-hp. and larger tractors; claimed to have large capacity for power required, easy to maneuver in close quarters; has hydraulic power control.

Scraper easy to operate in close quarters

12-Yd. Scraper

R. G. Le Tourneau, Inc., Peoria, Ill., and Stockton, Calif., announces a new model 12-yd. "carryall" wheeled scraper, much like its predecessor except that tires have changed to larger size—18x24 in., low pressure.

To accommodate the larger tires, the front yoke was heightened, resulting in greater clearance and easier turning. The return spring assembly is housed in the tailgate itself, and the reserve cable reel is mounted atop the tailgate, making it handier to pull new cable through the sheaves. The ball bearings in these sheaves are especially designed with a built-in, dust-proof seal, to insure free rolling cable and long bearing life.

Air Compressors

Sullivan Machinery Co., Michigan City, Ind., announces a new compressor unit designed specifically for truck mounting with power take-off from the truck propeller shaft. The compressor is two-stage, air-cooled with capacity of 105 c.f.m. delivered—enough to operate a large rock drill.

Features stressed are force-feed lubrication, anti-friction main bearings, automatic control and small space requirements so that major part of truck space can be utilized to carry men, tools and materials.

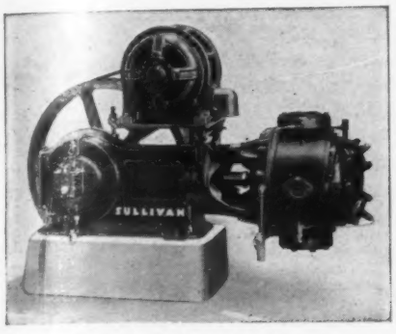
A stationary, heavy-duty air compressor, single-stage, single-cylinder, double-acting, horizontal type, is also new. It is built in sizes from 10 to 50 hp. and for pressures from 5 to 150 lb. Advantages claimed are long life, low power cost and fully automatic operation.

Wheeled scraper of 12-yd. capacity with larger tires

Two views of 8-yd. scraper used to pick up big boulders

Compressor mounted on truck

Features stressed are Timken double row main bearings, replaceable cylinder liner and crosshead guide, tinned piston and crosshead, streamline long life valves.



Heavy-duty, stationary compressor

Manganese Steel Parts

AMERICAN MANGANESE STEEL CO., Chicago Heights, Ill., announces a new design of dragline bucket chain, for which a patent has been applied. Among the claims made for it are: increased strength, full line instead of point bearing between links, additional metal on the sides where abrasive wear comes, lighter than comparable cast chains, lighter weight than previous Amsco chain, tie bar across link prevents snarling and kinking, equalized metal sections insure more perfect heat treatment, made of heat-treated austenitic manganese steel.

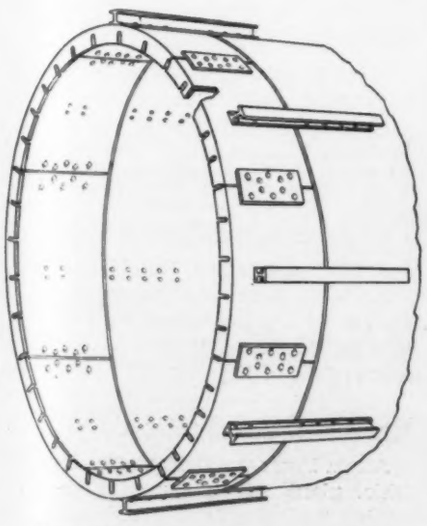
Kiln-End Nose Ring

Amsco engineers have also designed a kiln-end nose ring for rotary kilns of a special heat-resisting alloy, claimed to be "completely resistant" to extreme temperatures and the corrosive action of sulphur gases, present in nearly all combustion products. It is also claimed to be proof against warpage and distortion, which is hard on kiln linings.

New manganese steel chain design

The kiln ring consists of eight segments, each with ample expansion and contraction space on the seal lip, held together by butt straps bolted through slotted holes to eliminate twisting. The whole assembly is supported from the kiln shell by rigid I-beams.

It is said that Amsco alloy heat and corrosion resistant parts are used in many places by those industries that operate rotary kilns, so that plant operators are already familiar with this alloy as used in kiln-feed pipes; burner tips; pyrometer protector tubes; chains for hot clinker drags; liner plates for pressure coolers; liners and lifters for rotary clinker coolers; dampers, etc.



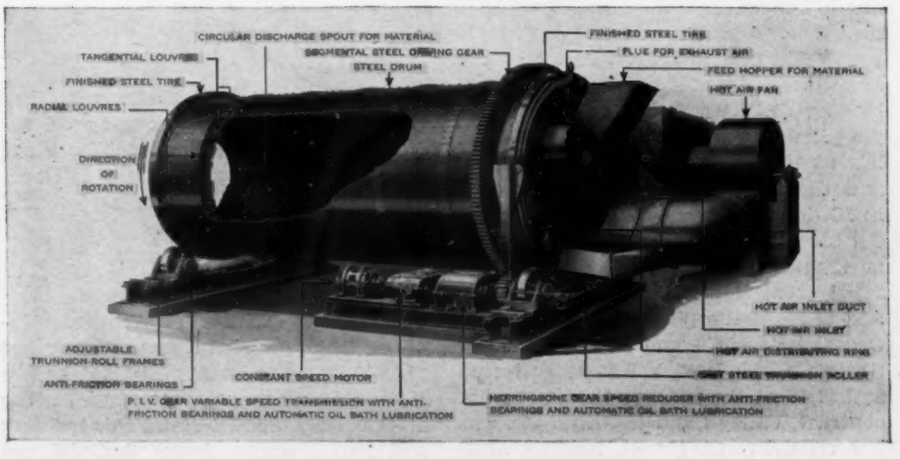
Heat-resisting nose ring for rotary kiln

Rotary Dryer

LINK-BELT CO., Chicago, Ill., announces that it has acquired the manufacturing and sales rights for North America, for the Dunford & Elliott rotary louvre dryer, of which many installations have been made in Europe, Canada and Japan.

It is being offered for the drying of all types of granular materials, coarse or fine, or of irregular shape, size and consistency; all types of crystals and powders manufactured or used in the chemical industry; factory refuse and waste; vegetable products, etc. It has also been employed as a heating or cooling unit; as a general reaction vessel; and for evaporating liquids on a solid substance. Among the materials handled are coal, coke, clay, fertilizers, ores, salt, sand, cement clinker and all manner of chemicals.

The dryer is a mechanically rotated horizontal drum with a series of internal channels near the circumference, into which hot air is admitted from a fan. These channels are covered by tangential plates which overlap in such a way as to leave a gap for hot air to pass from the channels into the inside of the drum and into the material contained therein, and at the same time to prevent any material from falling backwards. The channels are tapered so as to give the inner lining of the drum a gentle slope from the feed end to the discharge end. As the drum revolves, fresh channels come underneath the charge, but, as the hot air can only enter the channels when they are actually underneath the charge, all the gases must pass upwards through the bed of material.



Sectional view of rotary louvre dryer

Prices Bid—Contracts

SPRINGFIELD, MO.: Awards made by State Highway Department for gravel replacement on 152 miles of roadway were Cooley Gravel Co., Chillicothe, 60 miles at $23,000; James A. Visentine, Kansas City, 40 miles at $14,000; L. W. Hayes, Bethany, 52 miles at $27,000.

• • •

DELPHOS, OHIO: Contract let to the Delphos Quarries Co., only bidder, for city requirements; all sizes of crushed stone except No. 7, f.o.b., plant, 80c per ton; washed limestone sand, 80c; limestone sand, 60c; for deliveries anywhere in the city, 20c per ton more.

• • •

BILLINGS, MONT.: Mountain State Co. here awarded contract to supply concrete aggregates for Casper - Alcova U. S. Reclamation Project in Wyoming at $250,040.

• • •

STONEHAM, MASS.: Bids received from Maurice H. McKenna Coal Co. and W. W. Fisk Co. same for 12-in. reinforced-concrete pipe, 95c per ft.; 15-in. reinforced-concrete pipe, $1.35 per ft.; concrete brick $13.50 per M.

• • •

ERIN, TENN.: Lehman Rye contracted to supply Houston county soil erosion service members with agricultural limestone at $1.50 per ton, f.o.b. plant.

• • •

BIRMINGHAM, ALA.: Bids on cement for the impounding dam for the industrial water supply system near Inland in Blount county were opened by the City Commision. The Lone Star Cement Co. submitted the low bid of $2.02 per bbl. Six other bidders submitted a price of $2.03 a bbl. Bids on 66,600 bbl. of slag cement were included. The Southern Cement Co. and Cheney Lime & Cement Co. each bid $1.73 per bbl., but the Cheney company limited its bid to 12,000 bbl.

• • •

ROCHESTER, N. Y.: County purchasing agent received bids for 20,000 tons of crushed stone or gravel, and for 10,000 tons, on two WPA projects. J. E. Redman Sand & Gravel Co. was low on the 20,000 tons of gravel on a delivered basis, bidding $1.20 per ton, and 80c at the pit. Newport Sand & Gravel Co. was low at the pit, offering $1.35 delivered and 64c at pit, with 2% off for cash in 20 days. The Valley Sand & Gravel Co. bid $1.40 per ton delivered and 65c at the pit. Dolomite Products Co. offered crushed stone at $1.58 delivered and $1.25 at the pit. Le Roy Lime and Crushed Stone Co. and General Crushed Stone Co., Le Roy, bid $2.95 delivered and $1.15 at the pit. For the 10,000-ton contract, Valley Sand & Gravel Co. was low on delivered gravel, bidding $1.30 on that basis and 65c at the pit. Newport Sand & Gravel Co. was low at the pit, bidding 64c and $1.35 delivered with a 2% discount. J. E. Redman's bid was $1.36 and 80c. For 10,000 tons of stone, Dolomite Products bid low on delivered, $1.62 per ton, and $1.25 at the pit. The two Le Roy firms were tied for low at the pit, $1.25. The Le Roy Lime firm bid $2.10 delivered and the General Crushed Stone Co. $2.15.

• • •

FAYETTE, MO.: WPA quarries are furnishing locally pulverized agricultural limestone to farmers at 70c per ton, f.o.b. quarry.

• • •

SANTA CRUZ, CALIF.: Central Supply Co. was lone bidder on 100 cu. yd. of ready-mixed concrete for street paving, at $8.35 per cu. yd., or $7.85 for cash before the 10th of the month.

• • •

LOS ANGELES, CALIF.: California Portland Cement Co. awarded contract for 320 bbl. of cement by U. S. Indian Irrigation Service at $1.92 per bbl. f.o.b. mill, Colton, Calif.

New Gravel Plant

RIVERSIDE ENGINEERING CORP., Riverhead, N. Y., is building a new sand and gravel plant. W. S. Conklin is president. The company has dredging contracts in the Peconic river and does highway contracting.

Moving Plant

LEGRAND LIMESTONE CO., Chicago, Ill., is moving the equipment of its sand and gravel plant at Peterson, Iowa, to the new site near Sioux Rapids, Iowa, where it has leased 30 acres, as noted in ROCK PRODUCTS, September issue, p. 65.

Old Quarry Reopened

CLARK SANDSTONE CO., Battle Creek, Mich., has been organized to reopen an old quarry of Marshall sandstone, once used quite extensively in southern Michigan for buildings. Frank Clark is the head of the company.

Buys Quarry

D. F. TADLOCK, Fort Madison, Ia., has purchased the Osburne quarry on the Deeds farm, two miles west and one mile north of Denmark, and will specialize in the production of agricultural limestone.

Damaged by Fire

MASSILLON WASHED GRAVEL CO., Navarre, Ohio, suffered a loss estimated at $10,000 by a fire on August 25. The fire started in the early morning in the blacksmith shop, destroyed this building and an oil storage house, but did not damage the plant proper.

New Rock Products Demands

SAN FRANCISCO, CALIF., harbor commissioners have decided to go ahead with pier reconstruction. Plans call for $1,500,000 expenditure which will require among other materials 54,000 bbl. of portland cement, 44,000 cu. yd. of aggregates, 48,000 tons of rock.

Gets Construction Contract

NEVADA ROCK AND SAND CO., INC., Reno, Nev., has been awarded a contract for construction of 6.69 miles of State Highway 3 between Minden and Cradlebaugh at $147,053.11.

Building Plant

AUSTIN BRIDGE CO., Dallas, Tex., which has the contract for furnishing 435,000 tons of aggregate for the Buchanan dam on the Colorado River west of Austin, as noted on p. 43, August issue of ROCK PRODUCTS, is just completing a crushed stone plant of 125 tons hourly capacity. Rock is to be hauled ½ mile in Hug trucks from the quarry to the crushing plant. Primary crushing will be done by a 15 x 36-in. Universal jaw crusher, and a 36x24-in. Allis-Chalmers jaw crusher. Secondary crushing will be done by a 46 B Telsmith gyratory reduction crusher. Sizing will be accomplished over two 40-in. by 10-ft., single-deck, Pioneer vibrating screens. Sand is being gotten out of a creek bed 5 miles from the damsite. Aggregate will be furnished in ⅜ to ¾, ¾ to 1½, 1½ to 3 and 3 to 6-in. sizes. Ten hours' operation will be required for approximately a year to complete the contract.

Tow Boat Sinks

TENNESSEE VALLEY SAND AND GRAVEL CO., Sheffield, Ala., had its tow boat *Jayhawker* sink at the company's wharf September 11. It is supposed to have struck a rock in the river.

Changes Owners

HUGO SCHAEFER, Washington, Mo., has purchased the two barges, sand pump, and one truck belonging to the late Rudolph Stumpe and is now in charge of the sand business here.

For Sewage Filter Stone

J. H. SHEARS' SONS, Hutchinson, Kan., have taken a contract to supply 20,000 cu. yd. of crushed stone for the city's sewage treatment plant. A quarry 15 miles north of the city will be operated.

Resumes Production

ALPHA PORTLAND CEMENT CO., Ironton, Ohio, plant resumed production September 3 after a considerable period of inactivity.

THE INDUSTRY

New Incorporations

Happe-Hale Sand Co., Turner, Kan.; capital, 150 shares, no par value.

Texas Marble Co., Austin, Texas; capital, $20,000. Incorporators are J. O. Barrow and R. V. Anderson.

Pungo Sands Co., Durham, N. C.; capital, $10,000. Incorporators are D. J. Smith and Southgate Jones, 307 Chapel Hill.

Anchorage Quarry Co., Louisville, Ky.; capital, $5000. Incorporators are Dr. Charles Reiss, Fred Reiss and J. P. Castleman.

Holland Brick and Tile Co., Greenville, Miss. Incorporators are J. J. Holland, Jr., W. T. Wynn and Dr. John W. Shackelford.

O'Neal Rock and Sand Co., Inc., Miami, Fla.; 50 shares, no par value. Incorporators are George J. Ramsey, F. M. Desjardins, 2883 S. W. 25th St., and J. Baber.

General Concrete Products Co., Miami, Fla.; 100 shares, $100 par value. Incorporators are F. H. Rutschaw, 315 S. W. 63rd Ct., H. J. Bell and I. P. Henderson.

New Castle Sand and Gravel Co., Inc., Wilmington, Del.; to deal in sand, gravel, crushed stone, etc.; $5000. Incorporators are Arthur Carota, Rose Gentile and Domenick Cantera.

The States Rock Asphalt Co., Inc., 1258 S. Michigan Ave., Chicago, Ill.; to manufacture and sell asphalt; 1000 shares common. Incorporators are Sam Cole, T. L. Cox and W. P. J. Halley.

Rock Wool Insulation Co., Boston, Mass.; 150 shares common, no par value. Incorporators are Edward F. Byrnes, 1124 Brook Rd., Milton, Mass.; Mary L. Byrnes and C. Joseph Byrnes.

Personals

Fred Lyman, former assistant promotion director of the Portland Cement Association, has joined Fuller & Smith & Ross, Cleveland, as account executive.

Melvin H. Baker, president of National Gypsum Co., Buffalo, N. Y., recently sailed for a five-weeks' visit to Europe to inspect the company's foreign interests.

A. E. Perry, president of the Concho Sand and Gravel Co., Oklahoma City, Okla., is reported to have recovered from injuries received recently in an automobile accident.

W. W. Fischer, president of Fischer Lime and Cement Co., Inc., Memphis, Tenn., returned August 30 from a two-months' trip to Holland, Belgium, France, Germany and England.

F. R. McMillan, research director of the Portland Cement Association, Chicago, Ill., was one of the United States delegates to the third world power conference held in Washington, D. C., September 2.

O. A. Willison represented The Marietta Concrete Corp., Marietta, Ohio, at a state convention of concrete vault manufacturers at Bremen, Ohio, early in September. The state organization plans to expand, and he was appointed to a state committee to represent the manufacturers in Southeastern Ohio.

Obituaries

David J. Kelly, general manager of the Greer Limestone Co., Greer, W. Va., died August 26 after an illness of several weeks. He was 61 years old.

Liberatore Castagnozzi, 48, owner and president of the Milwaukee Block Co., cement block manufacturers, Milwaukee, Wis., died September 5 after a week's illness. Mr. Castagnozzi came to the United States about 35 years ago. He was secretary of the Milwaukee Concrete Products Association.

William H. Devos, 80, pioneer manufacturer of concrete masonry units of Milwaukee, Wis., died August 28 after a long illness which culminated in a series of heart attacks. He was a well-known citizen of Milwaukee, having served his community as alderman and as state senator. In 1902 he was made collector of customs under President Theodore Roosevelt and kept this post till 1911. He founded the William H. Devos Co. to manufacture concrete units more than half a century ago and remained president of the firm until his death.

Charles F. Henning, 55, vice-president and a director of the United States Gypsum Co., Chicago, Ill., died October 3 as a result of injuries sustained early October 2 when he was run over by his own automobile in an unusual accident. While driving homeward in the suburbs with Mrs. Henning, his car had run out of gasoline. Having edged it to the side of the highway, he had turned his lights on and had stepped in front of his car to hail passing motorists for aid when another car, driving up from behind, struck the rear of Mr. Henning's car with such force that it catapulted forward, knocked Mr. Henning down and ran over him. A graduate of Lewis Institute, Mr. Henning joined the United States Gypsum Co. 28 years ago as construction engineer. He was promoted to manager of the contracting department in 1916, and then, successively, to assistant general sales manager in 1920, sales manager in 1921, and shortly thereafter to vice-president and director.

Crushed Stone

Wheeling, W. Va.: The city council plans to operate two crushed stone quarries as WPA work relief projects.

Barnesville, Ohio: Belmont county commissioners are operating two portable crushing plants for highway stone.

Reinbeck, Iowa: Grundy county supervisors are reopening rock quarry closed since July 1 as a WPA highway project.

Nebraska City, Neb.: John C. Miller, the county highway foreman, is reopening rock quarry at Douglas, idle for many months.

Boonville, Mo.: Cooper county commissioners have opened three limestone quarries as a WPA project for soil conservation.

Muscatine, Iowa: Work on the Muscatine county rock quarry was begun early in September. F. P. G. Halbfass is county engineer.

Fort Madison, Iowa: Lee county commissioners plan to open two new quarries as WPA projects. A. W. Benson is WPA regional engineer.

Okemah, Okla.: Okfuskee county commissioners have rented a portable crushing plant to produce crushed stone from a quarry north of town.

Cook & Cone, Ottawa, Kan., are operating a crushing plant near Burlington, Kan., in three shifts, working 24 hours a day to supply a local highway job.

Fayette, Mo.: Howard County Soil Conservation Committee is sponsoring operation of three limestone quarries for production of agricultural limestone.

Grant City, Mo., authorities have leased a portable crushing plant to produce crushed stone with WPA labor for local highways.

Jefferson City, Mo.: Cole county commissioners are opening six limestone quarries for production of agricultural limestone for soil conservation projects.

Hastings, Minn.: Chicago, Milwaukee & St. Paul Railroad has opened a rock quarry near Hastings to secure riprap for flood protection of tracks near LaCrosse, Wis.

Holden, Mo.: Johnson county commissioners have purchased a new portable crushing plant to make agricultural limestone as a soil conservation project.

Shelbyville, Mo.: Shelby County Soil Conservation Association is sponsoring operation of two limestone quarries to produce agricultural limestone for sale to farmers at cost.

Fairfield, Iowa: Jefferson county board of supervisors has purchased second-hand crushing plant of Barton & Warner Co., Sioux City, for operation at county quarry south of Libertyville.

Oskaloosa, Iowa: Mahaska county supervisors are stripping a new quarry site in Jefferson township and have purchased a new portable crushing plant to produce crushed stone for highways.

North Wilkesboro, N. C.: Perry McGlome, contractor for section of Blue Ridge parkway between Laurel Springs and Air Bellows gap, has opened a rock quarry near Laurel Springs to produce crushed stone for highway work.

Spruce Pine, N. C.: State highway department began operation of its Woodlawn, McDowell county, crushed stone plant early in September. Besides supplying highway stone, this state enterprise also produces pulverized agricultural limestone.

Sturgeon Bay Co., Sturgeon Bay, Wis., large producers and shippers of dolomite for various purposes, has appointed C. G. Knoblauch vice-president and general manager. Mr. Knoblauch was formerly the general superintendent of the National Lime and Stone Co. at Findlay, Ohio.

Sand and Gravel

Gladbrook, Iowa: Tama county commissioners have rented two Diesel caterpillar tractor powered scrapers to strip gravel pit on northeast edge of town.

Manufacturers

Robert W. Hunt Co., engineers, Chicago, Ill., has appointed Frederick S. Cook as Pacific Coast manager, with headquarters at San Francisco, Calif.

Four Wheel Drive Auto Co., Clintonville, Wis., has appointed Albert Fillnow director of inventory parts sales. William Elliott has been made service engineer.

The W. W. Sly Manufacturing Co., Cleveland, Ohio, has appointed Alexander Haigh, 141 Milk St., Boston, Mass., as its representative for the New England states.

The Jaeger Machine Co., Columbus, Ohio, has completed a new, modern, general office building, and has converted its old office building into shops and experimental plant.

Harnischfeger Corp., Milwaukee, Wis., has appointed Arthur Wagner Co., 701 W. Washington St., Chicago, Ill., as a distributor in the northern Illinois territory.

Leeds & Northrup Co., Philadelphia, Penn., has opened a new sales and service office at Boston, Mass. The address is 422 Chamber of Commerce Bldg., 80 Federal St.

American Hoist & Derrick Co., St. Paul, Minn., announces that S. M. Hunter, formerly sales manager of the Novo Engine Co., is now affiliated with its sales department.

Broderick & Bascom Rope Co., St. Louis, Mo., announces opening of a branch office and warehouse at 1500 S. Western Ave., Chicago, Ill., with E. M. Stephanus in charge.

United States Rubber Products, Inc., New York, N. Y., has appointed H. H. Steck, formerly of the Norton Co., as grinding wheel sales representative in the Pittsburgh, Penn., district.

Pittsburgh Testing Laboratory, Pittsburgh, Penn., announces election of A. R. Ellis to its presidency, to succeed B. H. Witherspoon, who resigned. Mr. Ellis has risen steadily to his present office since joining the organization in 1905.

Barber-Greene Co., Aurora, Ill., announces appointment of Earl D. Stearns as sales manager. Mr. Stearns is a widely known conveying engineer, and his experience includes work with Stephens-Adamson Manufacturing Co. and Robins Conveying Belt. Co.

Electroline Co., Chicago, Ill., has purchased manufacturing and selling rights on wire rope and cable fittings covered by the H. C. Fiege patents, which apply to a novel method of holding the ends of stranded wire ropes or cables by bending them over or around and passing them through a tapered metal plug enclosed in a steel body.

Trade Literature

The following literature is obtainable on request to the respective sponsor:

Batching Equipment. Bulletin 1529, 8 pages, illustrates and describes equipment for industrial proportioning. BLAW-KNOX CO., Pittsburgh, Penn.

Compressors. Bulletin C36 describes a full line of compressors. O. K. CLUTCH AND MACHINERY CO., Columbia, Penn.

Screens. "Champion" vibrating screens, smooth in action, are featured in Bulletin 5364. GOOD ROADS MACHINERY CORP., Kennett Square, Penn.

Gears. Standard listings, weights and dimensions on gears, sprockets and chain are listed in catalog 56-6 of 80 pages. MEDART CO., St. Louis, Mo.

"Angledozers." Digging and sidecasting with speedy and well-designed "Angledozers" are described in a 12-page booklet, No. A-104. R. G. LE TOURNEAU, INC., Peoria, Ill.

Sprocket Wheels. A 24-page book, No. 1557, features wheels with Silverlink finished-steel roller chains, available on a quick-delivery, mail-order basis. LINK-BELT CO., Chicago, Ill.

Refrigerating Machines. Bulletin 1104, 16 pages, explains the absorption method of refrigerating and gives illustrations of three types of units. CARBONDALE MACHINE CORP., Harrison, N. J.

Controllers. A set of bulletins dealing with various automatic temperature and humidity controls and accessories is bound for file reference. THE POWERS REGULATOR CO., Chicago, Ill.

Speed Reducers. Bulletins 1100 and 2100, 60 pages, catalog Falk speed reducers and include information regarding specifications, ratings, dimensions and couplings. THE FALK CORP., Milwaukee, Wis.

Air-Operated Controllers. "Air-O-Line" potentiometers, "throttlors" and other types of controllers are taken up in a 32-page catalog, No. 8901. THE BROWN INSTRUMENT CO., Philadelphia, Penn.

Steam Turbines. Bulletin 1179, 36 pages, covers in detail condensing automatic extraction turbine frames for capacity range of 500 kw. through 5000 kw. ALLIS-CHALMERS MFG. CO., Milwaukee, Wis.

Engineers. A 4-page leaflet shows names of some of the lime companies which have availed themselves of the designing, erecting, analyzing and consulting service of ARNOLD & WEIGEL, Woodville, Ohio.

Belt Conveyors. Bulletin 51, 4 pages, describes portable conveyors with roller bearing troughing carriers, return idlers, head shaft and tail shaft bearings. NEW HOLLAND MACHINE CO., New Holland, Penn.

Explosives. A 44-page booklet bound in "Zaflex", describes the uses and characteristics of industrial explosives, blasting caps, safety fuses, and all kinds of blasting accessories. ATLAS POWDER CO., Wilmington, Del.

Insulating Products. More than fifty J-M insulating products are described and illustrated in a 64-page vest-pocket size booklet, "Barriers to Industrial Waste." Tables of recommendations covering heating and power, ovens and dryers, heat treating furnaces, and non-ferrous smelting are included. JOHNS-MANVILLE, New York, N. Y.

Machinery Lubrication. Volume 21, number 2, is a 16-page technical publication devoted to the selection and use of specialty lubricants for special machinery. TEXAS CO., New York, N. Y.

Blast Cleaning Equipment. Up-to-date information is given in a new and complete "Quick Reference" catalog, 16 pages, on blast cleaning and dust collecting equipment. PANGBORN CORP., Hagerstown, Md.

"Bearings of Cranes," 36 pages, illustrates worm wheel, cross travel shaft, line shaft, and other types of mountings. Tables of fits and tolerances and general specifications are included. SKF INDUSTRIES, Philadelphia, Penn.

Recuperator. Bulletin 116, 22 pages, deals with the Colton-Lang recuperator for medium-length kilns and the Traylor-Cheesman burner for fuel economy in rotary kilns. TRAYLOR ENGINEERING AND MANUFACTURING CO., Allentown, Penn.

Fans. Bulletin 1002-2, 4 pages, gives dimension table, slow speed capacity table, and other information regarding low speed exhaust fans used in connection with dust collecting equipment. THE NORTHERN BLOWER CO., Cleveland, Ohio.

Conveyors. Bulletin 260, 28 pages, shows in picture form the broad scope of conveyors in all industries, giving the results of 44 years of invention in taking the job to the machine or the machine to the job. CHAIN BELT CO., Milwaukee, Wis.

Road-Building Equipment. The following new publications are available: Road Form Bulletin 101; Rapid Dowel and Expansion Joint Spotter Bulletin Q-6; Heltzel Leveler Grader Bulletin Q-7. HELTZEL STEEL FORM & IRON CO., Warren, Ohio.

Lubrication Equipment. The revised mid-year 1935 Alemite Powergun Equipment Catalog, 24 pages, presents, in natural colors, the equipment necessary for all kinds of lubrication jobs. Prices are given. STEWART-WARNER CORP., Chicago, Ill.

Blast Cleaning Equipment. The "Quick Reference" catalog, 16 pages, is a complete condensed catalog covering airless and air blast cleaning, with concise information and illustrations. PANGBORN CORP., Hagerstown, Md.

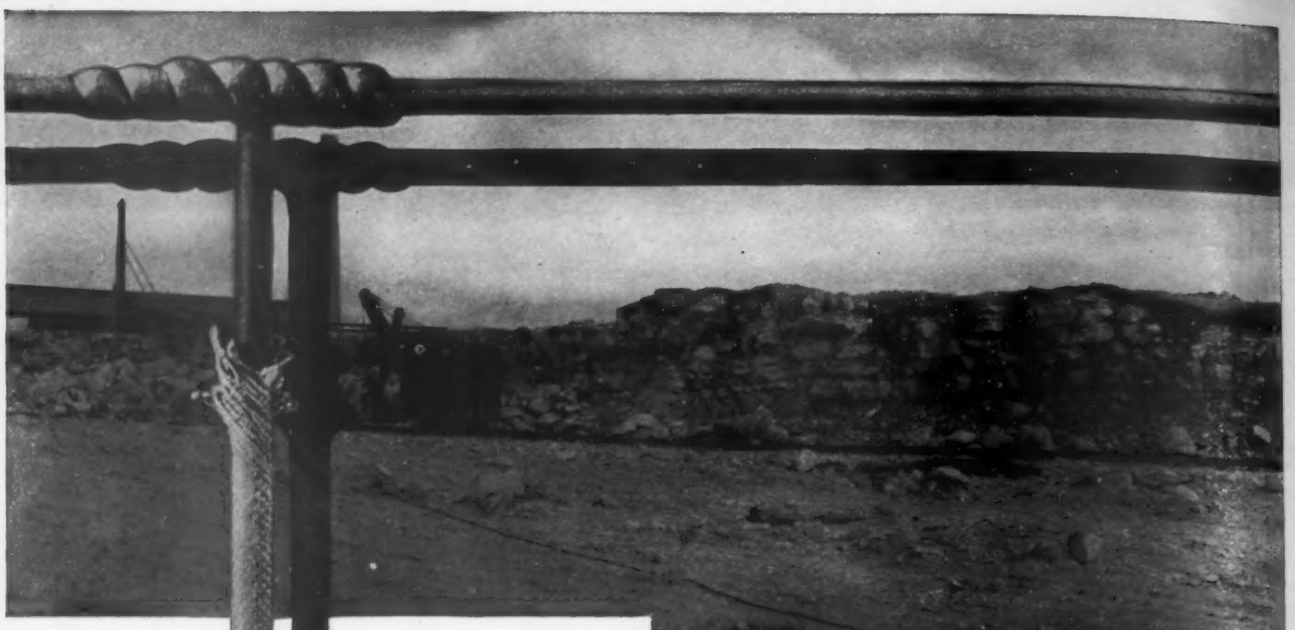
Shovel. "Speedcrane," a large, fast machine, is described in a 16-page booklet. Construction details of crane, shovel and dragline are given as well as unit weights of various types of buckets and of the materials they handle. MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.

Machinery Bulletin. Jaw crushers, rotary crushers, crushing rolls, hammer mills, ring roll mills, rock emery mills, air separators, dry batch mixers, elevators and excavators are described in a 64-page "miniature bulletin". Full-sized bulletin is also available. STURTEVANT MILL CO., Boston, Mass.

Drill. An unusual mailing piece, in the shape of a drill cutout, describes the smallest and lightest weight electric drill yet developed. "The Midget," designed for 3/16-in. wood and metal drilling, is said to weigh only 2 lb. 10 oz. Electric nut runners and screw drivers are also described. CHICAGO PNEUMATIC TOOL CO., New York, N. Y.

Tractors. "Caterpillar Diesel on the Farm" and "New Caterpillar Tractors (Diesel RD4 and Thirty)" are two new publications, showing action and detail photographs of the equipment. "The Story of Ten Caterpillar Diesels", 28 pages, reveals the present activities of the first Caterpillar Diesel tractor built and of every thousandth tractor built since. CATERPILLAR TRACTOR CO., Peoria, Ill.

Pumps and Compressors. Recent Worthington releases are L-620-B16, vertical two-stage air-cooled compressors, types V3-A2 and V6-A2; L-611-B11 and L-611-B12, single tandem horizontal two-stage and single horizontal three-stage steam and motor driven compressors, types HB-2, HB-3, HS-2 and HS-3; W-321-B9, centrifugal pumps, types DE, DF and DG for heads up to 250 ft.; W-1200-B17, hand-rotated stopers, model WS-3, dry and wet. WORTHINGTON PUMP AND MACHINERY CORP., Harrison, N. J.



AT ARKANSAS PORTLAND CEMENT CO.

Cordeau-Bickford Detonating Fuse and Ensign-Bickford Safety Fuse

A perfect team where teamwork counts. Cordeau-Bickford detonates all loads and connects all holes. It permits split-second rotation, relieving burden, and gaining the greatest efficiency from every pound of explosive used. With Cordeau each cartridge goes with the force of a primer cartridge, thus resulting in better fragmentation.

A Cordeau hook-up may be detonated with a single cap. When Ensign-Bickford Safety Fuse is used to activate the cap—as it is here—the perfect team is in operation. Cordeau with its distinct advantages and Safety Fuse—inexpensive, positive, and reliable—form a combination that makes for lowered operating costs and greater efficiency.

Cordeau-Bickford Detonating Fuse is manufactured with the same precision that has made Ensign-Bickford Safety Fuse famous since 1836. Let us send you our Centennial Book—and tell you more about Cordeau and Safety Fuse.

1836 BEGINNING A NEW CENTURY 1936 · ENSIGN-BICKFORD SAFETY FUSE ·

CB-56

The ENSIGN-BICKFORD COMPANY, Simsbury, Connecticut

SAFETY FUSE Since 1836 • CORDEAU-BICKFORD DETONATING FUSE

WE'LL BE LOOKING FOR YOU

• •

at the

Twenty-First Annual Convention

of the

NATIONAL SAND and GRAVEL ASSOCIATION

Those perplexing problems of yours and of the whole industry will be discussed. Hear what the other fellow has to say about them—what remedies are offered and go back with those invaluable suggestions that stop losses and make for added profits.

There will also be an exhibition of modern machinery and equipment used in the production, distribution and consumption of sand and gravel.

Hotel PEABODY— Memphis, Tenn.

December 7, 8, 9 and 10, 1936

BE SURE TO COME!

NATIONAL SAND AND GRAVEL ASSOCIATION

MUNSEY BUILDING
WASHINGTON, D. C.

Rock Products

RECOGNIZED LEADER

WHY.....

Because it is the oldest publication serving the field—its leadership is acknowledged by the high type of influential readers subscribing to this journal year after year—some having been subscribers for a great number of years.

ROCK PRODUCTS enjoys a renewal percentage that totals 76% which is much higher than for most trade publications.

PROOF.....

Mr. Stewart N. Dunning, president of The Atlas Sand, Gravel and Stone Co., Hartford, Conn., writes: "We are pleased to advise you that we prefer ROCK PRODUCTS to any other publication in our field and subscribe for all of our superintendents."

Mr. C. L. McKenzie, president of Duquesne Slag Products Co., Pittsburgh, Pa., writes: "We are of the opinion that in the field that it covers, it is the leading journal."

Mr. C. F. Krueger, Superintendent, of Castalia Portland Cement Company, Castalia, Ohio, says: "Our company subscribes to several publications; however, for coverage of the Cement Industry we prefer ROCK PRODUCTS."

And there are hundreds of letters from presidents, vice-presidents, superintendents and managers all expressing their preference for ROCK PRODUCTS.

EDITORIAL SUPREMACY

ROCK PRODUCTS enjoys much of its popularity among the big men of the industry because of the high editorial standards set and for many years maintained by its editor in chief, NATHAN C. ROCKWOOD, whose opinions and advice are constantly sought by those who have long recognized him as an authority.

OF THE INDUSTRY

SERVICE . . .

ROCK PRODUCTS maintains a staff of expertly trained engineer-editors, who travel thousands of miles each year and spend thousands of dollars in securing the most timely material of greatest interest and value to our readers. ROCK PRODUCTS, because it has the respect and confidence of the leading operators throughout the industry, is many times able to secure BIG TIME NEWS—months before the story breaks!

ADVERTISING VALUE.....

ROCK PRODUCTS' value as an advertising medium is perhaps best measured by the fact that it has always led in number of pages of display advertising. The most prominent advertisers have used it as their sales vehicle consistently for many years. Many of these advertisers use ROCK PRODUCTS exclusively —they feel much the same about this authoritative journal as the executives whose comments you have read.

AND THAT BRINGS US DOWN TO THE MARKET . . . . . .

The rock products market is enjoying the greatest business revival in years. Shipments of Portland Cement for the first six months of 1936 were 46,561,662 bbls., or 14,855,168 bbls. more than was shipped in the same period last year. That the industry is awake to the demands created can be seen by the recent report stating that one large cement company alone has a rehabilitation program of about $5,000,000. We will be pleased to send further data to those advertisers who appreciate the tremendous possibilities of a market whose gigantic revival necessitates the immediate purchase of equpment representing millions of dollars.

ANNOUNCING

Twentieth Annual Convention
National Crushed Stone Association

Netherland Plaza Hotel • Cincinnati, Ohio
JANUARY 18, 19 and 20, 1937

In conjunction with which will be held

THE MANUFACTURERS' DIVISION EXPOSITION OF MACHINERY, EQUIPMENT, AND SUPPLIES

THE Annual Convention of the National Crushed Stone Association has, during the years since its inception, become recognized as an event of outstanding significance to crushed stone producers individually and to the industry as a whole.

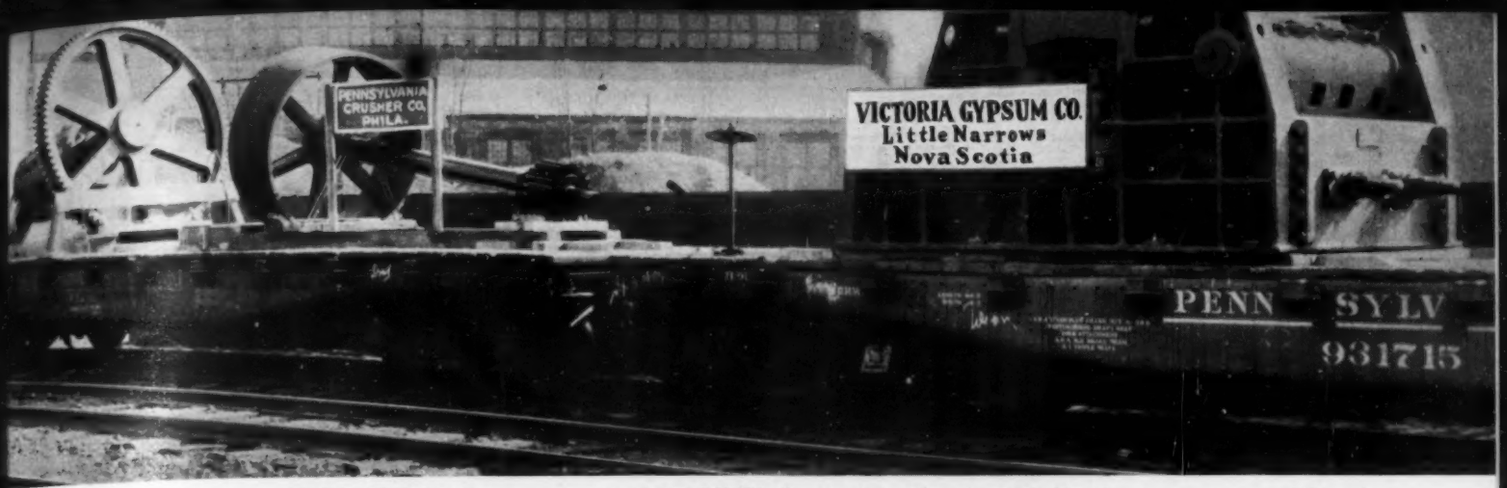
It serves, as no other medium can, to develop, crystallize, and express industry opinion. It signifies solidarity of purpose and the ability of those engaged in the same line of activity to unite in the solution of common problems.

As individuals, producers will find much to reward them for a visit to Cincinnati next January: Speakers of outstanding reputation and experience will discuss problems of timely interest, both technical and legislative; opportunity will be afforded for the mutually beneficial exchange of opinions with fellow-producers, to say nothing of the pleasure to be derived from renewing old acquaintanceships; the Manufacturers' Division Exposition will command studious attention for the helpful suggestions to be obtained from an inspection of the latest developments and improvements in machinery and equipment used in the crushed stone industry.

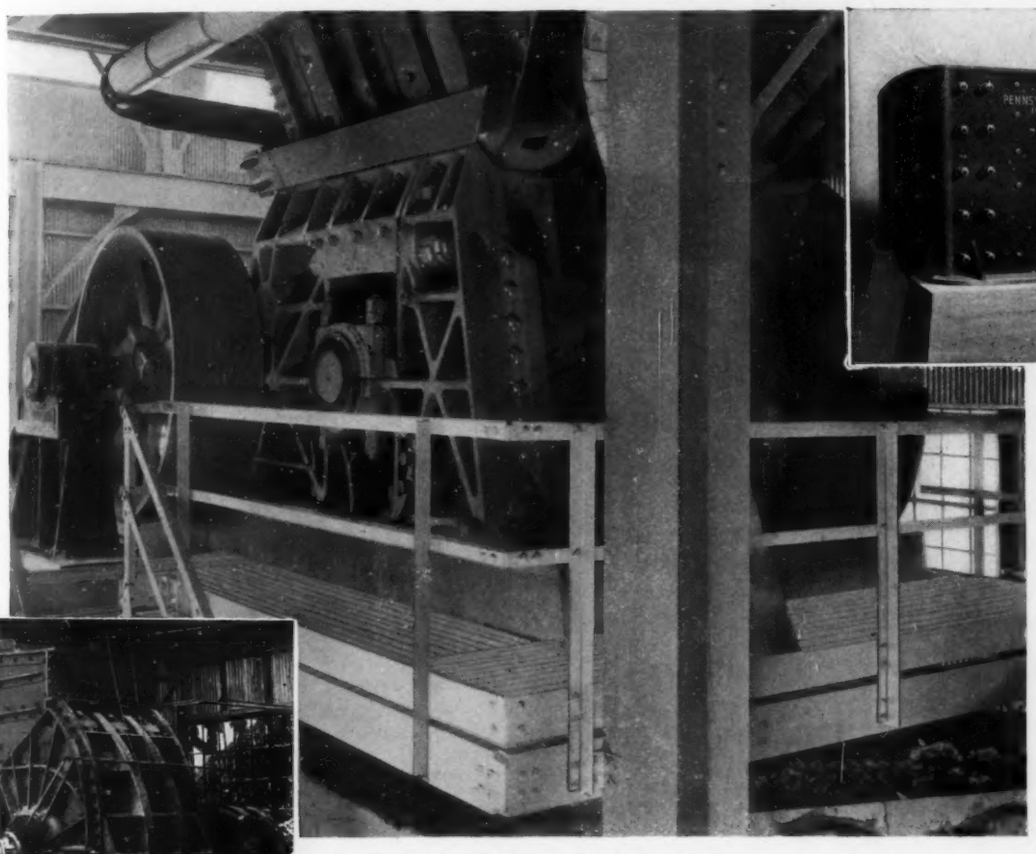
ALL crushed stone producers of the United States and Canada, whether or not members of the National Crushed Stone Association, are cordially invited to attend our Twentieth Annual Convention. Make your plans now to be present at Cincinnati on January 18, 19 and 20, 1937.

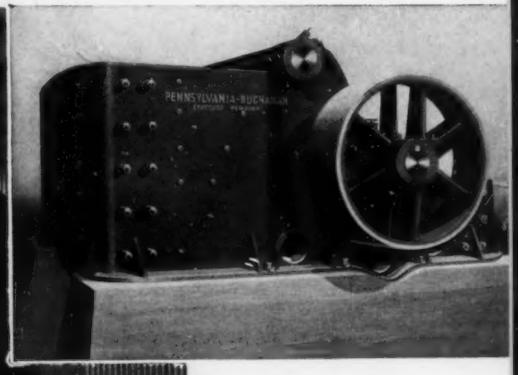
For further information write to

NATIONAL CRUSHED STONE ASSOCIATION
1735 Fourteenth Street, N. W. . . . Washington, D. C.

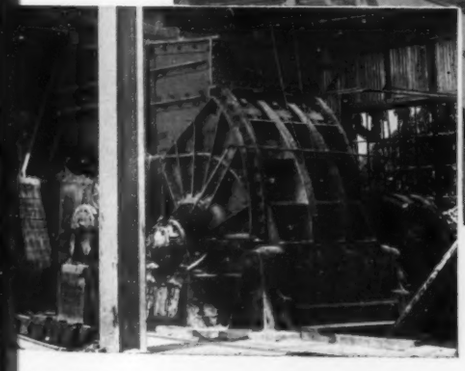


"PENNSYLVANIA" PENN-LEHIGH Primary and PENNSTEEL Secondary Single Roll Crushers, enroute to Victoria Gypsum Company's new plant, Little Narrows, Nova Scotia





"PENNSYLVANIA-BUCHANAN" STEEL-BUILT Primary Jaw Crushers are available in six (6) major sizes, for the initial reductions of Limestone, Cement Rock, Road-Building Materials, Aggregate and Metaliferous Ores.

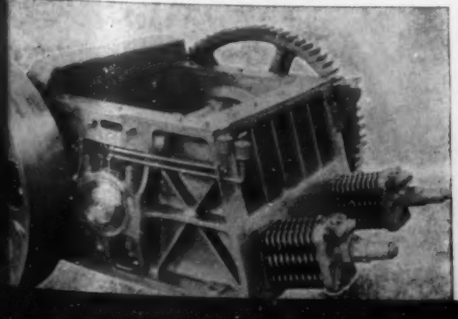


"PENNSYLVANIA" PENN-LEHIGH Series Primary Single Roll Crusher preparing hard Limestone and Lehigh Valley Cement Rock for the Secondary reduction at modern Lehigh Valley Cement Plant.

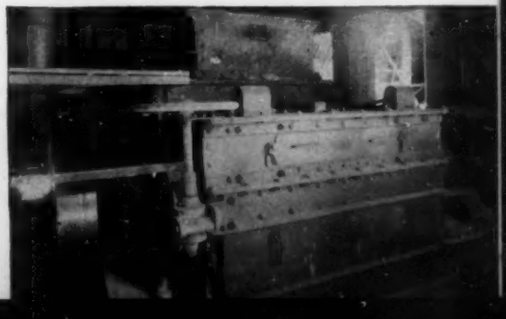
PENN-PRIMARY Hammermill preparing Steam Shovel for Compartment Mills, in dependable Double Reduction service.

SERVICE: Cooperative study of individual plant requirements, leading to suggestion of practical layouts and efficient heavy duty equipment, is the basis of "Pennsylvania" engineering-sales presentation. Our experienced engineers are at your service. Descriptive Bulletins on request.

PENNSTEEL Series Single Roll Secondary Crusher for Victoria Gypsum Co., Little Narrows, Nova Scotia.



"PENNSYLVANIA" STEELBUILT SUPER-THOR Series Hammermill, specialized for Secondary reduction in modern Cement Plant service.



Put Your Reduction Problems Up to Us

PENNSYLVANIA CRUSHER COMPANY

GENERAL OFFICES
Liberty Trust Building, Philadelphia
Representatives in Principal Cities
Associated with
Fraser & Chalmers Eng. Wks., London
Offices throughout the world

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Acetylene Welding Rod
American Steel & Wire Co. (United States Steel Corp. Subsidiary)

Agitators, Thickeners and Slurry Mixers
Dorr Company, Inc.
F. L. Smidth & Co.

Airveyor
Fuller Co.

Air Compressors
Fuller Co.
Ingersoll-Rand Co.
Nordberg Mfg. Co.
F. L. Smidth & Co.
Traylor Engr. & Mfg. Co.

Air Filters
Fuller Co.

Air Separators
Bradley Pulverizer Co.
Raymond Bros. Impact Pulv. Co.
W. W. Sly Mfg. Co.
Sturtevant Mill Co.

Applicator Bars
Stulz-Sickles Co.

Automatic Weighers
Merrick Scale Mfg. Co.
Richardson Scale Co.

Babbitt Metal
Joseph T. Ryerson & Son, Inc.

Backfillers
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.

Bagging Machinery
Richardson Scale Co.

Ball Bearings
SKF Industries, Inc.

Balls, Grinding, (See Grinding Balls)

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co.
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)
F. L. Smidth & Co.

Bar Benders and Cutters
Koehring Co.

Batchers
Fuller Company

Bearings
Chain Belt Co.
Link-Belt Co.
Joseph T. Ryerson & Son, Inc.
SKF Industries, Inc.
Timken Roller Bearing Co.

Bearings (Anti-Friction)
SKF Industries, Inc.
Timken Roller Bearing Co.

Bearings (Roller)
SKF Industries, Inc.
Timken Roller Bearing Co.

Bearings (Tapered Roller)
Timken Roller Bearing Co.

Bearings (Thrust)
SKF Industries, Inc.
Timken Roller Bearing Co.

Belt Fasteners
Flexible Steel Lacing Co.

Belt Lacing (Steel)
Flexible Steel Lacing Co.

Belting (Elevator and Conveyor)
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.

Belting (Metal, Conveyor, High and Low Temperature)
Wickwire Spencer Steel Co.

Belting (Transmission)
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.

Belting (V Type)
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan Inc.

Bin Gates
Chain Belt Co.
Fuller Co.
Link-Belt Co.
Sprout, Waldron & Co., Inc.
Traylor Engr. & Mfg. Co.

Bins
Austin-Western Road Machy. Co. (Sand and Gravel)
Pioneer Gravel Equip. Mfg. Co. (Steel)
Traylor Engr. & Mfg. Co.

Blasting Cap Protectors
B. F. Goodrich Co.

Blasting Machines
Atlas Powder Co.
Hercules Powder Co.

Blasting Supplies
Atlas Powder Co.
Hercules Powder Co.

Blasting Powder (See Powder, Blasting)

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
SKF Industries, Inc.
Timken Roller Bearing Co.

Blocks (Sheave)
American Manganese Steel Co.

Blowers
W. W. Sly Mfg. Co.

Bodies (Car & Motor Truck)
Easton Car & Construction Co.

Boilers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Boots and Shoes
B. F. Goodrich Co.

Breakers (Primary)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Bucket Dumps
Dempster Bros., Inc.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Geo. Haiss Mfg. Co., Inc.
Hayward Company
Link-Belt Co.
Owen Bucket Co.

Buckets (Dragline and Slackline)
American Manganese Steel Co.
Bucyrus-Erie Co.
Owen Bucket Co.
Page Engineering Co.
Pioneer Gravel Equip. Mfg. Co.

Buckets (Dredging and Excavating)
Owen Bucket Co.

Buckets (Elevator and Conveyor)
Chain Belt Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.

Bulldozers
Koehring Co.

Bushings (Machined or Processed)
Manganese Steel Forge Co., Inc.

Cableways
American Steel & Wire Co. (United States Steel Corp. Subsidiary)
Broderick & Bascom Rope Co.
General Electric Co.
Link-Belt Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Calcinators
Bradley Pulverizer Co.

Calcining Kettles (Gypsum)
J. B. Ehrsam & Sons Mfg. Co.

Cap Crimpers and Fuse Cutters
Ensign-Bickford Co.

Caps (Blasting)
Atlas Powder Co.
Hercules Powder Co.

Car Pullers
Link-Belt Co.

Cars (Dump)
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)
Koppel Industrial Car & Equip. Co.

Cars (Quarry & Gravel Pit)
Austin-Western Road Machy. Co.
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)
Easton Car & Construction Co.
Koppel Industrial Car & Equip. Co.

Castings
Babcock & Wilcox Co.
Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
F. L. Smidth & Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Central Mixing Plants (Concrete)
Chain Belt Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.
Jeffrey Mfg. Co.
Manganese Steel Forge Co., Inc.

Chain Drives
Chain Belt Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Chain Belt Co.
Link-Belt Co.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chute or Launder Lining
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.

Chutes and Chute Liners
American Manganese Steel Co.
Manganese Steel Forge Co., Inc.

Clarifiers
Dorr Company, Inc

Classifiers
Dorr Company, Inc.
Hardinge Co., Inc.
Link-Belt Co.

Clay Working Machinery
Bonnot Company

Clips (Wire Rope)
American Steel & Wire Co. (United States Steel Corp. Subsidiary)
Broderick & Bascom Rope Co.
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Austin-Western Road Machy. Co.
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Compressed Air Rock Drills
Cleveland Rock Drill Co.

Compressors (See Air Compressors)

Concentrators (Slurry, etc.)
Dorr Company, Inc.

Concrete Breakers
Ingersoll-Rand Co.

Concrete Pipe Machinery
Universal Concrete Pipe Co.

Concrete Slab Raising Equipment (Mud-Jack)
Koehring Co.

Conveyor Belting (See Belting)

Conveyor Idlers and Rolls
Chain Belt Co.
Link-Belt Co.

Conveyors and Elevators
Earle C. Bacon, Inc.
Chain Belt Co.
Fuller Company
Jeffrey Mfg. Co. (Vibrating)
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Sturtevant Mill Co.
Traylor Engr. & Mfg. Co.

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

Conveyoweighs
Richardson Scale Co.

Coolers (See Kilns and Coolers, Rotary)

Correcting Basins
F. L. Smidth & Co.

Couplings (Air Hose)
Cleveland Rock Drill Co.
Ingersoll-Rand Co.

Couplings (Flexible and Shaft)
Chain Belt Co.
Link-Belt Co.

Couplings (Hose, Pipe, etc.)
B. F. Goodrich Co.

Cranes (Clamshell)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Koehring Co.

Cranes (Crawler and Locomotive)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Koehring Co.
Link-Belt Co.
Thew Shovel Co. (Electric, Gasoline and Steam)

Cranes (Excavator)
Koehring Co.

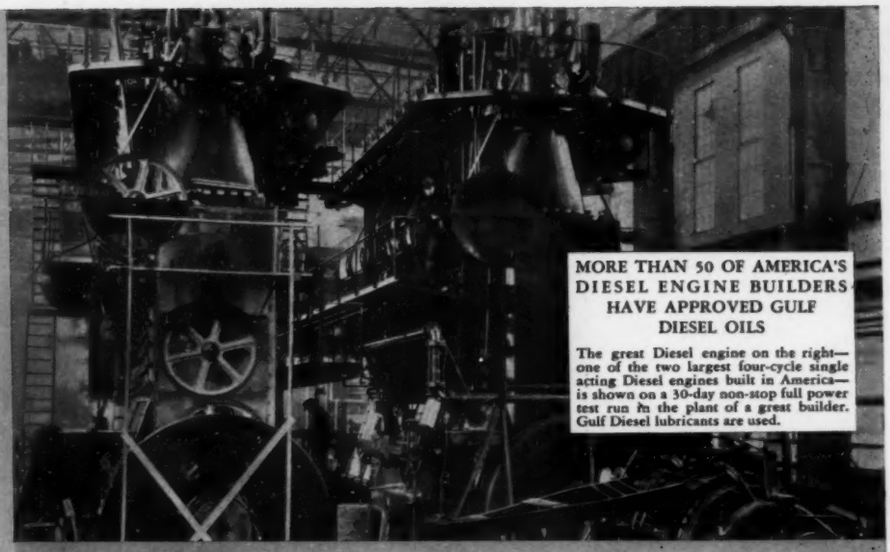
Crusher Parts
American Manganese Steel Co.
American Pulverizer Co.
Pennsylvania Crusher Co.

Crushers (Hammer)
American Pulverizer Co.
Austin-Western Road Machy. Co.
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Pennsylvania Crusher Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Earle C. Bacon, Inc.
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Lewistown Fdy. & Mach. Co. (Jaw)

BUILDERS AND OPERATORS agree

GULF DIESEL OILS preserve close tolerances in Diesel Engines



MORE THAN 50 OF AMERICA'S DIESEL ENGINE BUILDERS HAVE APPROVED GULF DIESEL OILS

The great Diesel engine on the right—one of the two largest four-cycle single acting Diesel engines built in America—is shown on a 30-day non-stop full power test run in the plant of a great builder. Gulf Diesel lubricants are used.

For all Diesels used in quarrying equipment, the Gulf engineer is prepared to recommend the lubricants which will keep maintenance costs at lowest levels possible.

LEADING DIESEL BUILDERS use Gulf Diesel Oils in their plants for engine run-ins and tests before shipment. That speaks volumes for the quality of these Diesel lubricants.

Today's Diesels are built with close tolerances. Moving parts are carefully calibrated to assure close fit and long life. A lubricant of highest quality is needed to minimize wear and maintain the efficiency of the unit from the start.

Gulf Diesel Oils—approved by more than 50 of America's Diesel engine builders—have demonstrated their value in scores of plants from Maine to Texas. They are the most economical lubricants you can use.

Gulf Oil Corporation ★ Gulf Refining Company

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PENNSYLVANIA

Makers of

that Good Gulf Gasoline and Gulflube Motor Oil

GULF INDUSTRIAL LUBRICATION

Classified Directory—*Continued*

Crushers (Jaw) (Cont'd)
New Holland Machine Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Pioneer Gravel Equip. Mfg. Co.
Smith Engineering Works
Traylor Engr. & Mfg. Co.

Crushers (Reduction)
Bonnot Company
Jeffrey Mfg. Co.

Crushers (Ring)
American Pulverizer Co.

Crushers (Roll)
American Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Pioneer Gravel Equip. Mfg. Co.

Crushers (Rotary)
American Pulverizer Co.
J. B. Ehrsam & Sons Mfg. Co.

Crushers (Single Roll)
Austin-Western Road. Machy. Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.
New Holland Machine Co.
Sturtevant Mill Co.
Traylor Engr. & Mfg. Co.

Cupolas (Rock Wool)
Whiting Corp.

Detonators
Atlas Powder Co.
Hercules Powder Co.

Dewatering Machines
Dorr Company, Inc.

Diaphragms (Pump)
B. F. Goodrich Co.

Dippers (Manganese Steel)
American Manganese Steel Co.

Dippers and Teeth (Steam Shovel)
American Manganese Steel Co.
Bucyrus-Erie Co.
The Frog, Switch & Mfg. Co.
Thew Shovel Co.

Dirt Moving Equipt. (Dumptor)
Koehring Co.

Ditchers
Bucyrus-Erie Co.

Draglines
Bucyrus-Erie Co.
Link-Belt Co.
Page Engineering Co.
Thew Shovel Co.

Draglines (Gasoline or Electric)
Koehring Co.

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Sauerman Bros., Inc.

Dragline Excavators
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Page Engineering Co.
Thew Shovel Co. (Electric, Gasoline and Steam)

Dragline Excavators (Walking)
Bucyrus-Monighan Co.

Dredge Pumps (See Pumps, Dredging)

Dredges
Bucyrus-Erie Co.
Hayward Co.
Hetherington & Berner, Inc. (Complete Steel)
Morris Machine Works

Dredging Sleeves
B. F. Goodrich Co.

Drill Bits
Ingersoll-Rand Co.
Timken Roller Bearing Co.

Drill Sharpening Machines
Ingersoll-Rand Co.

Drill Sharpening Service
A. Courchesne, Inc.

Drill Steel
Cleveland Rock Drill Co.
Ingersoll-Rand Co.

Drilling Accessories
Cleveland Rock Drill Co.

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co.

Drills (Diamond Core)
Ingersoll-Rand Co.

Drills, Hammer (See Hammer Drills)

Drills (Rock)
Cleveland Rock Drill Co.
A. Courchesne, Inc.
Ingersoll-Rand Co.

Drills (Tripod)
Cleveland Rock Drill Co.

Drills (Wagon)
Cleveland Rock Drill Co.
Ingersoll-Rand Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company
Combustion Engineering Corp.
Hardinge Company, Inc.
Traylor Engr. & Mfg. Co.

Dumptors
Koehring Co.

Dust Arresters
American Fdy. Equip. Co.
W. W. Sly Mfg. Co.
Western Precipitation Co.

Dust Collecting Systems
Allis-Chalmers Mfg. Co.
American Fdy. Equip. Co.
Western Precipitation Co.

Dust Conveying Systems
Fuller Company

Dynamite
Atlas Powder Co.
Hercules Powder Co.

Electric Cables and Wires
American Steel & Wire Co. (United States Steel Corp. Subsidiary)
John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.
General Electric Co.

Elevator Belting (See Belting)

Emery Mills
Sturtevant Mill Co.

Engineers
Bonnot Company
Dorr Company, Inc.
Fuller Co.
Hetherington & Berner, Inc.
Productive Equipment Corp.
F. L. Smidth & Co.
Sturtevant Mill Co.

Engines (Diesel)
Ingersoll-Rand Co.
Nordberg Mfg. Co.

Engines (Gasoline, Kerosene and Oil)
New Holland Machine Co.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Co.

Excavators (Dragline)
Koehring Co.

Explosives
Atlas Powder Co.
Hercules Powder Co.

Fans
General Electric Co.

Fans (Exhaust)
W. W. Sly Mfg. Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Chain Belt Co.
Fuller Co. (Cement and Pulverized Material)
Hardinge Company, Inc. (Weighing)
Pioneer Gravel Equip. Mfg. Co.
Smith Engineering Works (Plate)

Filters (Air)
W. W. Sly Mfg. Co.

Filters (Dust)
W. W. Sly Mfg. Co.

First Aid Supplies
Davis Emergency Equip. Co.

Forgings
Manganese Steel Forge Co., Inc. (Steel)

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Fuses (Electrical)
General Electric Co.

Gaskets
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.

Gasoline
Socony-Vacuum Oil Co., Inc.
Texas Company

Gears and Pinions
Chain Belt Co.
General Electric Co.
Link-Belt Co.

Gelatin and Semi-Gelatin (See Explosives)

Goggles
Davis Emergency Equip. Co.

Grapples
Owen Bucket Co.

Grease
Gulf Refiining Co.
Socony-Vacuum Oil Co., Inc.
Texas Company

Grinding Balls
Babcock & Wilcox Co.
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)

Grizzlies
American Manganese Steel Co.
Manganese Steel Forge Co., Inc.
Productive Equipment Corp.
Smith Engineering Works
Traylor Engr. & Mfg. Co.

Grizzly Feeders
Traylor Engr. & Mfg. Co.

Hammer Drills
Cleveland Rock Drill Co.
Ingersoll-Rand Co.

Hammer Mills (See Crushers)

Hoists
Ingersoll-Rand Co.
Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.

Hoppers and Spouts
Manganese Steel Forge Co., Inc.

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
Cleveland Rock Drill Co.
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.
Ingersoll-Rand Co.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Hose Couplings (See Couplings—Hose, Pipe, etc.)

Insulation (Electric)
General Electric Co.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Bonnot Company
Manitowoc Engr. Works
F. L. Smidth & Co.
Traylor Engr. & Mfg. Co.

Kominuters (See Mills)

Laboratory Crushers
Sturtevant Mill Co.

Lamp Guards
Flexible Steel Lacing Co.

Lighters, Hot Wire (For Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Company
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Lime Kilns (See Kilns and Coolers, Rotary)

Linings (Iron for Ball and Tube Mills) (See Mill Liners)

Linings (Rubber for Chutes, Ball and Tube Mills, Tank and Pipe)
B. F. Goodrich Co.

Loaders and Unloaders
Bucyrus-Erie Co.
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Link-Belt Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Diesel)
The Fate-Root-Heath Co.
Plymouth Locomotive Works

Locomotives (Diesel-Electric)
The Fate-Root-Heath Co.
Plymouth Locomotive Works

Locomotives (Gas-Electric)
The Fate-Root-Heath Co.
Plymouth Locomotive Works

Locomotives (Oil-Electric)
The Fate-Root-Heath Co.
Plymouth Locomotive Works

Locomotives (Steam, Gas and Electric)
General Electric Co.
Plymouth Loco. Works (Gas)

Locomotives (Storage Battery)
General Electric Co.

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
American Steel & Wire Co. (United States Steel Corp. Subsidiary)
Broderick & Bascom Rope Co. (Wire Rope)
Gulf Refining Co.
Socony-Vacuum Oil Co., Inc.
Texas Company

Machinery Guards
Harrington & King Perf. Co.

Magnetic Pulleys
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.

Magnets
General Electric Co.

Manganese Steel (Plates and Sheets)
Manganese Steel Forge Co., Inc.

Manganese Steel Castings
American Manganese Steel Co.
The Frog, Switch & Mfg. Co.

Manganese Steel Parts
American Manganese Steel Co.
Manganese Steel Forge Co., Inc.

Mechanical Rubber Goods
B. F. Goodrich Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Babcock & Wilcox Co.
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)
F. L. Smidth & Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Bonnot Company
Bradley Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Hardinge Co., Inc.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Engr. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Mine Handling Equipment
Chain Belt Co.

Mixers (Commercial Concrete)
Jaeger Machine Co.

Mixers (Concrete)
Gruendler Crusher & Pulv. Co.
Koehring Co.

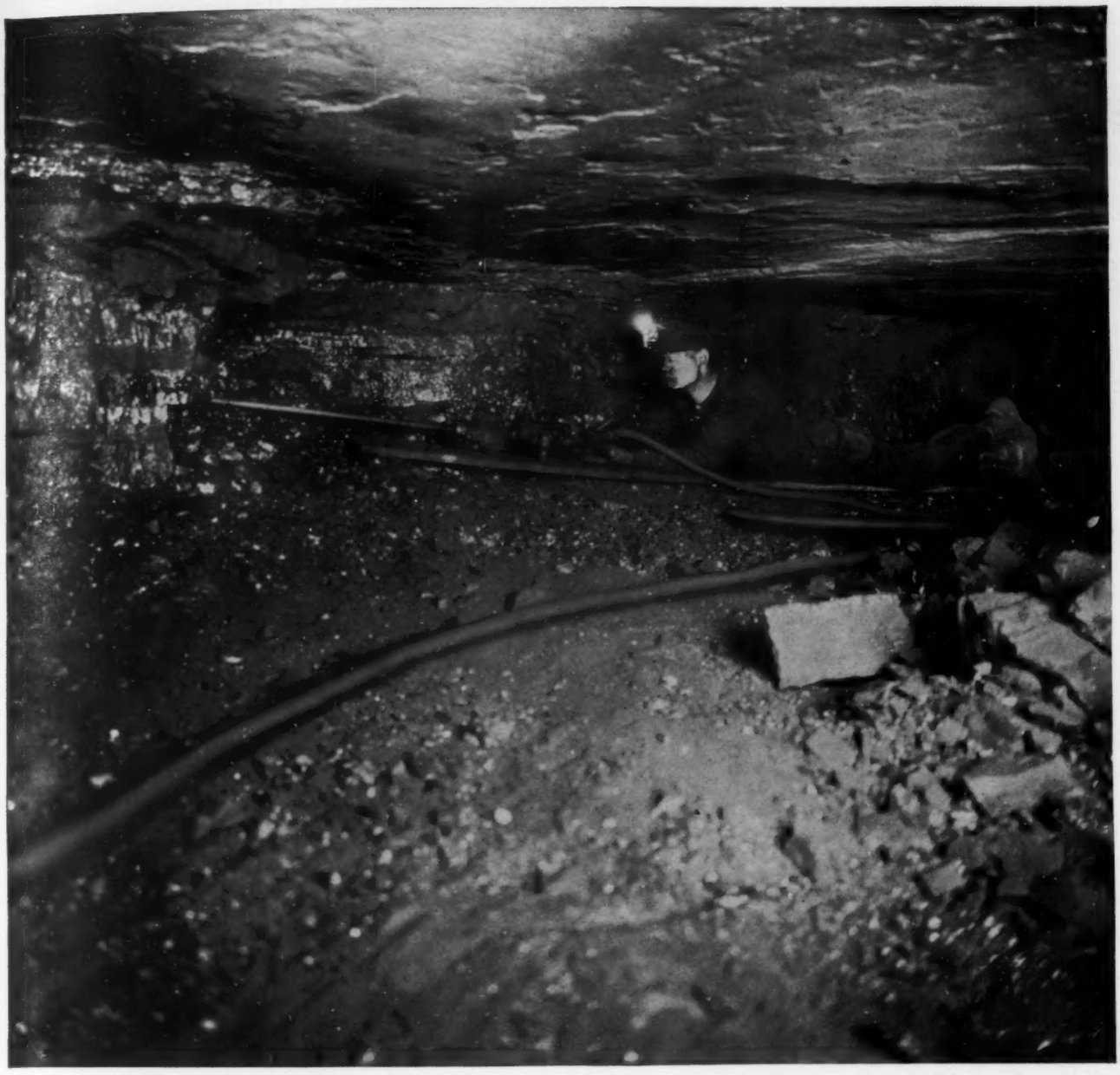
Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
General Electric Co.

Nozzles (Gravel Washing)
Chain Belt Co.

Oil Burners
Babcock & Wilcox Co.
F. L. Smidth & Co.

Oils (Lubricating)
Gulf Refining Co.
Socony-Vacuum Oil Co., Inc.
Texas Company

Packings (Pump, Valve, etc.)
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.



HOSE INSTEAD OF DYNAMITE

A typical example of Goodrich improvement in rubber

FOR generations coal has been mined by drilling holes in the face of the seam, and setting off powder blasts in the holes. Trouble is, this shatters the coal and increases proportion of wasteful slack, and also releases deadly after-damp fumes, terror of miners.

An explosion is simply a sudden release of pressure. Working on this principle, an Illinois coal company developed a steel cylinder which—replacing gun powder in the drilled hole—released air pressure of 20,000 pounds per sq. in., with explosive effect.

But, how to get that 10-ton pressure into the cylinder? Working underground, the supplying tube had to be flexible.

The company came to Goodrich, and Goodrich engineers went to work. First they compounded a special hose rubber and perfected a stouter cord. Then they developed a method of wire braiding to grip the hose against internal pressure—⅛ *mile* of wire per foot of hose.

The completed hose withstands a pressure of 20,000 to 25,000 pounds per square inch—10 to 12 tons for every square inch of inner hose surface. That is 3 times the pressure inside a gun barrel. . . . you could use this Goodrich hose on a rifle.

Whether or not you use high-pressure hose in your operation, this Goodrich development is important to you. Remember that all the skill and unique knowledge gained in developing these thousands of special products are available *and used* in the manufacture of *every* Goodrich product—belting, packing, hose—32,000 items of rubber. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich

ALL *products problems* IN RUBBER

Classified Directory—*Continued*

Paint (Asphalt)
Texas Company

Pavers (Concrete)
Koehring Co.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Wickwire Spencer Steel Co.

Pipe Molds (Concrete)
Universal Concrete Pipe Co.

Plates (Double Corrugated)
Hendrick Mfg. Co.

Pneumatic Drills (See Drills)

Portable Compressors
Ingersoll-Rand Co.

Portable Conveyors
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Link-Belt Co.

Portable Crushing and Screening Unit
Austin-Western Road Machy. Co.
Pioneer Gravel Equip. Mfg. Co.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Powder (Blasting)
Atlas Powder Co.
Hercules Powder Co.

Power Transmission Machinery
Chain Belt Co.
SKF Industries, Inc.

Precipitators
Western Precipitation Co.

Pulleys, Magnetic (See Magnetic Pulleys)

Pulverators
Allis-Chalmers Mfg. Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Austin-Western Road Machy. Co.
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co.
New Holland Machine Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Pulverizer Parts
American Manganese Steel Co.

Pumps (Air Lift)
Fuller Company

Pumps (Cement)
Fuller Company

Pumps (Cement Slurry)
American Manganese Steel Co.
Dorr Company, Inc.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Ingersoll-Rand Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)
American Manganese Steel Co.
Bucyrus-Erie Co.
Morris Machine Works

Pumps (Pulverized Coal)
Babcock & Wilcox Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Hetherington & Berner, Inc.
Morris Machine Works
A. R. Wilfley & Sons

Quarry Cars
Easton Car & Const. Co.
Koppel Industrial Car & Equip. Co.

Railways (Electric)
General Electric Co.

Railway Equipment
General Electric Co.

Ready Mixed Concrete (Truck Mixer Bodies)
Chain Belt Co.

Recovery Plants (Dust)
W. W. Sly Mfg. Co.

Recuperators
Manitowoc Engr. Works

Reinforcement Fabric (Concrete)
Wickwire Spencer Steel Co.

Respirators
Davis Emergency Equip. Co.

Road Machinery
Koehring Co.

Rock Bits (See Drill Bits)

Rock Cars
Koppel Industrial Car & Equip. Co.

Rock Drills (See Drills, Rock)

Rock Wool Machinery
Whiting Corp.

Rod Mills
Traylor Engr. & Mfg. Co.

Rods (Wire)
Wickwire Spencer Steel Co.

Roller Bearings
SKF Industries, Inc.
Timken Roller Bearing Co.

Roofing (Ready to Lay)
Texas Company

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

Rope, Wire (See Wire Rope)

Rubber Covered Screens
B. F. Goodrich Co.

Safety Equipment
Davis Emergency Equip. Co.

Sand Drag
Smith Engineering Works

Sand and Gravel Handling Equipt.
Sprout, Waldron & Co., Inc.

Sand Separators
Pioneer Gravel Equip. & Mfg. Co.

Sand Settling Tanks
Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.
Smith Engineering Works

Sandblast Equipment
W. W. Sly Mfg. Co.

Scales (Automatic Proportioning)
Merrick Scale Mfg. Co.
Richardson Scale Co.

Scales (Cement)
Merrick Scale Mfg. Co.
Richardson Scale Co.

Scrapers (Power Drag)
Austin-Western Road Machy. Co.
Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.
Sauerman Bros., Inc.

Screens
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Earle C. Bacon, Inc.
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Link-Belt Co.
National Wire Cloth Co.
Nordberg Mfg. Co.
Pioneer Gravel Equip. Mfg. Co.
John A. Roebling's Sons Co.
Smith Engineering Works
Sturtevant Mill Co.
Traylor Engr. & Mfg. Co.
Universal Vibrating Screen Co.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works

Screens (Vibrating)
Austin-Western Road Machy. Co.
Link-Belt Co.
Nordberg Mfg. Co.
Pioneer Gravel Equip. Mfg. Co.
Robins Conveying Belt Co.
Smith Engineering Works
Sturtevant Mill Co.
W. S. Tyler Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screens (Woven Wire)
Wickwire Spencer Steel Co.

Screw Rewasher (Single and Twin)
Smith Engineering Works

Scrubbers, Washers
Allis-Chalmers Mfg. Co.
Hardinge Company, Inc.
Smith Engineering Works

Seal Rings
Traylor Engr. & Mfg. Co.

Separators (Magnetic)
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.

Separators (Slurry)
F. L. Smidth & Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Co.
Koehring Co.
Link-Belt Co.
Thew Shovel Co. (Crawling Tractor)

Silos
Marietta Concrete Corp.
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.

Slings (Wire Rope)
American Steel & Wire Co. (United States Steel Corp. Subsidiary)
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Sockets (Wire Rope)
American Steel & Wire Co. (United States Steel Corp. Subsidiary)

Speed Reducers
Link-Belt Co.
Traylor Engr. & Mfg. Co.

Springs (Extension, Compression, Torsion or Flat)
Wickwire Spencer Steel Co.

Sprockets and Chain
Chain Belt Co.

Steam Shovel Repair Parts
American Manganese Steel Co.

Steel Bars
Timken Roller Bearing Co.

Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.

Steel (Electric Furnace)
Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Steels, Drill (See Drill Steel)

Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Storage Equipment
Marietta Concrete Corp.

Tanks
Combustion Engineering Corp.
Dorr Company, Inc.
Link-Belt Co.

Tanks (Sand Settling)
Pioneer Gravel Equip. Mfg. Co.

Thickeners
Dorr Company, Inc.

Tires and Tubes
B. F. Goodrich Co.

Tools (Pneumatic)
Ingersoll-Rand Co.

Track Equipment
Carnegie-Illinois Steel Corp. (United States Steel Corp. Subsidiary)
Nordberg Mfg. Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
Koehring Co.

Tramways (Aerial Wire Rope)
American Steel & Wire Co. (United States Steel Corp. Subsidiary)
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Truck Bodies (Dump)
Easton Car & Construction Co.

Truck Bodies (Ready Mixed Concrete)
Jaeger Machine Co.

Trucks (Mixers)
Jaeger Machine Co.

Trucks and Trailers (See Motor Trucks)

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
B. F. Goodrich Co.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Underground Loaders
Thew Shovel Co.

Underground Shovels
Nordberg Mfg. Co.

Valves (Air)
Cleveland Rock Drill Co.

Valves (Pump)
B. F. Goodrich Co.

Vibrating Screens (See Screens, Vibrating)

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Dorr Company, Inc.
Eagle Iron Works
Gruendler Crusher & Pulv. Co.
Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.
Traylor Engr. & Mfg. Co.

Waste Heat Boilers
Combustion Engineering Corp.

Weighing Equipment
Merrick Scale Mfg. Co. (Automatic Proportioning)
Richardson Scale Co.

Weigh-Mix
Koehring Co.

Welding and Cutting Apparatus
General Electric Co.

Welding Electrodes (Nickel Manganese Steel)
Stulz-Sickles Co.

Welding Rod
American Steel & Wire Co. (United States Steel Corp. Subsidiary)
Joseph T. Ryerson & Son, Inc.

Welding Wire
American Steel & Wire Co. (United States Steel Corp. Subsidiary)
John A. Roebling's Sons Co.

Wire (Flat, Round, Square or Special Shapes)
Wickwire Spencer Steel Co.

Wire (Piano and Music)
Wickwire Spencer Steel Co.

Wire (Rubber Insulated)
American Steel & Wire Co. (United States Steel Corp. Subsidiary)

Wire Cloth
Cleveland Wire Cloth & Mfg. Co.
National Wire Cloth Co.
John A. Roebling's Sons Co.
W. S. Tyler Co.
Wickwire Spencer Steel Co.

Wire Rope
American Steel & Wire Co. (United States Steel Corp. Subsidiary)
Broderick & Bascom Rope Co.
Hazard Wire Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Wickwire Spencer Steel Co.
Williamsport Wire Rope Co.

Wire Rope Fittings
American Steel & Wire Co. (United States Steel Corp. Subsidiary)
Broderick & Bascom Rope Co.
Hazard Wire Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Slings (See Slings, Wire Rope)

Wire Rope Sockets (See Sockets, Wire Rope)

BONNOT *Reduction Crushers Perform in Ohio . . . . . .*

The above sketch pictures the actual setup and arrangement as installed in Akron, Ohio.

The feed from either bin is 2½" material and is reduced to 95% through ¾" without further screening or sizing. The gravel contains sufficient sand stone to provide the required percentage of fines.

This is an exceptionally tough crushing job because of fines and moisture. The Bonnot Reduction Crusher is handling this work very successfully, producing 20 tons per hour of ¾" with less than 10 HP.

With a Bonnot Crusher there is less maintenance; no rubbing or abrasive action to produce fines; less rejections; no oversize or slabs.

Let us show you what the efficient Bonnot Crusher can do for you. Full details are contained in Bulletin 150.

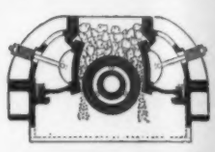
●

THE BONNOT CO.

CANTON, OHIO

• *SINCE 1891* •

NEW YORK OFFICE
30 CHURCH STREET



ALLIGATOR

TRADE MARK REG. U.S. PAT. OFFICE

STEEL BELT LACING

For Long Life of Belting

The clinched teeth of Alligator Steel Belt Lacing compress belt ends firmly, reducing destructive internal friction and ply separation.

"Never Lets Go." The most universally used belt lacing on earth. Has great strength. A smooth, durable joint that rocks on a sectional hinge pin. Supplied in steel, "Monel Metal," and alloys in eleven sizes for belts up to ⅝ in. Standard boxes, "Handy Packages," and long lengths. Identify the genuine by the dark green and yellow box. The Alligator and size number are stamped on the lacing.

Sold throughout the world. *Sole Manufacturers*

FLEXIBLE STEEL LACING CO.
4684 Lexington Street, Chicago
In England at 135 Finsbury Pavement, London, E. C. 2

MARIETTA

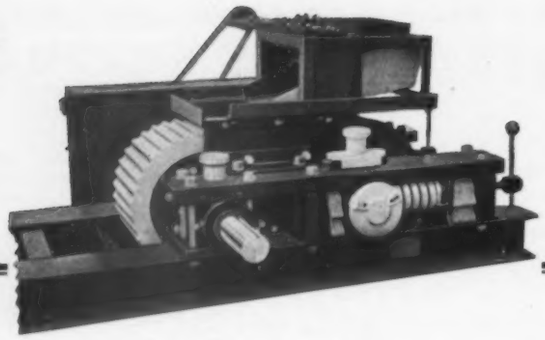
Storage Systems

Modern engineering methods applied to large scale material handling operations . . . that's MARIETTA. Complete storage plants designed, manufactured and erected for storing and conveying COAL, SAND, GRAVEL, LIME and other bulk materials.

Catalog on request

The Marietta Concrete Corp.

MARIETTA, OHIO



New Holland Crushing Rolls

On Tygart River Dam Project

When the producers of the tremendous quantity of sand required for the TYGART RIVER DAM PROJECT near Grofton, W. Va., found that the variations of the apparent natural river sand gradation made the meeting of rigid specifications difficult, an elimination of all the avenues of approach to the problem resulted in the installation of a set of NEW HOLLAND Type A 10-in. sand CRUSHING ROLLS. These were mounted on a small dredge.

The larger sizes of sand and small gravel shot were fed from rotating screens to the rolls by gravity and the crushed material washed down a chute into the sand box. This eliminated the extensive changes that hydraulic classifiers would have necessitated.

Two sets of No. 5NA, 24-in. NEW HOLLAND manganese steel rolls were also mounted on the shore over the sand loading track in such a manner that sand could be delivered by the loading derrick directly from barge to a two compartment bin above each set of rolls.

Write for catalogs on the New Holland line.

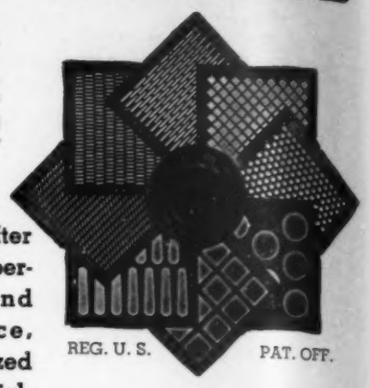
NEW HOLLAND MACHINE COMPANY

NEW HOLLAND . . . . . PA.

STANDARDIZE

on Hendrick

AND SAVE YOUR TIME!



REG. U. S. PAT. OFF.

Many buyers, after using Hendrick perforated plate and Hendrick service, have standardized . . . making Hendrick the headquarters for all their perforated metal requirements. It saves time.

With a consistency that satisfies, Hendrick perforated plate is uniformly good, it fits without special attention, and it is delivered promptly. Next time, try Hendrick.

HENDRICK MANUFACTURING CO.

47 Dundaff St., Carbondale, Pa.

SALES OFFICES IN PRINCIPAL CITIES
PLEASE CONSULT TELEPHONE DIRECTORY

Makers of Elevator Buckets of all types, Mitco Open Steel Flooring, Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.

NEW PROFITS

With the NEW DEMPSTER DUMPSTER

Speed—Efficiency—System—Economy. These and many more advantages assure added PROFITS when you use the NEW DEMPSTER BUCKET DUMP. Readily mounted on any truck chassis.

Detachable buckets spotted at points of loading are picked up by truck and dumped at destination and returned to loading points. Easy as A-B-C but mighty economical. Ask for details. You'll find much of interest to you.

DEMPSTER BROS., INC.

KNOXVILLE, TENN.

COURCHESNE DRILL RODS

(Specially Heat Treated)

Ingersoll Rand, Timken, Sullivan or Crusca Rods

The most modern equipment is used, including muffle type furnaces controlled by electric pyrometers, assuring correct heats as recommended by drill manufacturers for their particular steels.

A study of drill steel and drill bits has made it possible for us to specialize in this work.

A. COURCHESNE, INC.

Conversion Shop — Drill Steel & Steel Processing

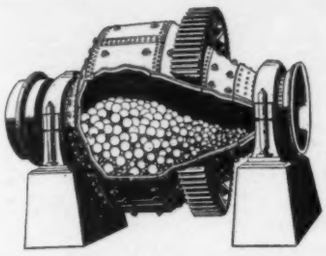
EL PASO, TEX.

COMPLETE HYDRAULIC DREDGES

SAND AND GRAVEL DREDGING PUMPS
AGITATING MACHINERY
DREDGE HOISTS
STEEL HULLS • PONTOONS
PIPE LINE ACCESSORIES

HETHERINGTON & BERNER, INC.

701-745 KENTUCKY AVENUE . . . . . INDIANAPOLIS, IND.



Every ball minds its own business

The Principle of the HARDINGE CONICAL MILL

Has stood the test of years and hundreds of installations

But we haven't stopped with that, as there are added advantages in:

—*new Integral Gear Drive*
—*new Method of Shell Construction*
—*new Feed Control*
—*new Co-ordinated Unit with controlled classification*

Ask about these features

HARDINGE COMPANY
INCORPORATED
YORK, PENNA.—Main Office & Works
NEW YORK—122 E. 42nd St. CHICAGO—205 W. Wacker Drive

The Profitable Way to Sell Concrete

JAEGER DUAL-SPEED TRUCK MIXERS of Man-Ten Long Life Steel

Rear Lift Hoist Attachment
One-Man Chute Saves Minutes Every Trip

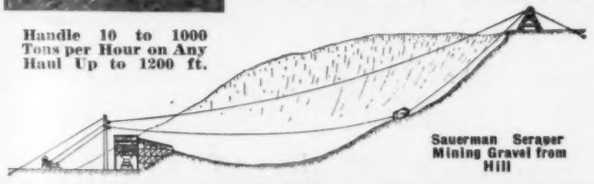
Write for New Catalog
THE JAEGER MACHINE CO.
603 Dublin Avenue, Columbus, Ohio

SAUERMAN SCRAPERS

Low cost machines for:
Pit and Bank Excavation—
Stripping—Stockpiling
Simple . . . Durable
. . . Easy to Operate

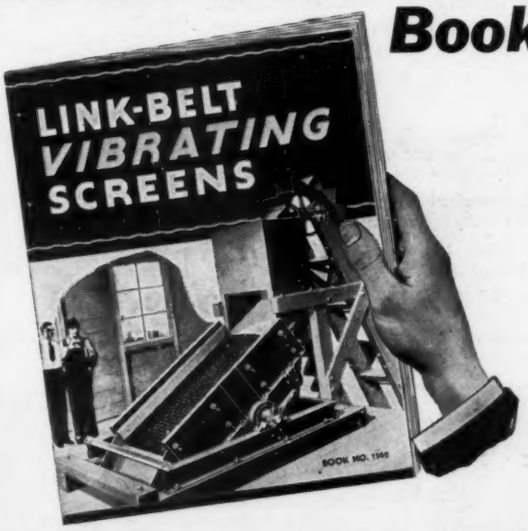
SAUERMAN BROS., INC.
430 SOUTH CLINTON ST., CHICAGO

Handle 10 to 1000 Tons per Hour on Any Haul Up to 1200 ft.



Sauerman Scraper Mining Gravel from Hill

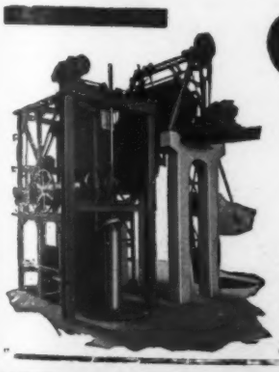
Send for this New Book!



● A new 24-page illustrated catalog, complete with clearance diagrams and dimension tables on the two distinct types of Link-Belt vibrating screens ("UP" and "PD") for accurately screening such materials as coal, clay, coke, sand, gravel, crushed stone, fertilizer, lime, ore, grain, sugar, chemicals, pulpwood chips, etc.

A copy of the new book will be sent upon request. Ask for No. 1562.

LINK-BELT COMPANY
2045 W. Hunting Park Ave. Philadelphia
Offices in principal cities 5816



CONCRETE PIPE EQUIPMENT

MACHINES
PIPE MOLDS
(New and Used)

All equipment necessary for the pipe manufacturer

UNIVERSAL CONCRETE PIPE CO.
COLUMBUS, OHIO

CLASSIFIED ADVERTISEMENTS

POSITIONS WANTED — POSITIONS VACANT—two cents a word. Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION
Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED — Displayed or undisplayed. Rate per column inch, $4.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

Used Equipment for Sale

CONSOLIDATED GOOD USED EQUIPMENT

1—18"x36" McLanahan-Stone Single Roll Crusher, Texrope drive, 25 HP. 3/60/440 volt motor.
1—7"x24" Sturtevant Jaw Crusher, to ½".
1—40"x42" Allis-Chalmers Jaw Crusher.
1—40"x42" Bacon-Farrel Jaw Crusher.
1—24"x20" Jeffrey type "B" Hammer Mill.
1—36"x36" No. 4XC Gruendler Hammer Mill, ball bearings. Also all other sizes.
2—6'x12' Hardinge Iron Lined Rod Mills.
1—4'x8' Kennedy Iron Lined Ball-Tube Mill.
1—3'x12' Hendy Iron Lined Tube Mill.
2—Gayco Air Separators, 10', 30".
10—Tyler Hammer Screens, 3x5 triple deck, No. 31; 2—3'x5' No. 31, single deck; 3—4'x7' No. 60, double deck. Also all other makes of Vibrating Screens.
2—6'x40' Bonnot direct heat Rotary Dryers, ½" shells, feed and discharge end spring seals, used two months.
8—Ruggles-Coles Rotary Dryers; 3x20' F-1, 8'x60', F-15; Class A double shell 5'x26', 6x35, 80"x45'.
3—3'x6"x17', 4x35, 5x30' indirect heat Rotary Dryers.
1—4x30' American Process Rotary Dryer.
8—Rotary Kilns, Bonnot Co., 6x40', 6x60', 8x100'.
2—8'x125' P. & M. Rotary Kilns.
3—P. & M. 8'6" and 9'6"x150' Rotary Kilns.
2—Raymond High Side Roller Mills, 3-roll, 5-roll; 1—5-roll Low Side.
4—Raymond Pulverizers, No. 0000, 00, 1; No. 00 Screen Mill.
6—Hardinge Iron Lined Ball Mills, 3'x8', 4½'x16", 6'x22". Also other sizes.
1—No. 32 Marcy Ball Mill.
1—No. 2 Sturtevant Ring Roll Mill, chain drive.
4—3'x6' Sturtevant Moto-Vibro Screens, 2-deck.
3—Sturtevant Rotary Fine Crushers, No. 1½, No. 1.
2—36x16, 20x14" Sturtevant Crushing Rolls.
Just a partial list.
WE WILL BUY A SINGLE MACHINE OR COMPLETE PLANT.
What do you wish to sell? Send us details.
CONSOLIDATED PRODUCTS COMPANY, INC.
15-16-17 Park Row New York, N. Y.
Plant and Shops at Newark, N. J., cover 8 acres of ground.

Pennsylvania SX4, SX6 & SXT12 Hammermills.
Superior 10", 13" & 36" McCully Crushers.
Traylor 4-10 TZ Reduction Crusher.
8—3-yd. Koppel V-shape, 36" Ga. Dump Cars.
Jaw Crushers: 60x84, 42x36, 42x40, 36x24 & 30x10.
2040' I.R. Class PRE-2 Elec. Air Compressor.
1730 ft. Bury Elec. Air Compressor.
676 ft. Worthington Air Compressor.
¾-yd. Erie B Steam Shovel.
3—1-yd. Erie B-2 Steam Shovels.
36x36 Jeffrey B2 Pulverizer.
25-ton Browning Locomotive Crane.
5-ton Whitcomb 24 Ga. Gas Locomotive.
No. 36 American Ring Hammermill.
Lawrence 10", 40 HP Elec. Centr. Pump.
40-ton Browning Locomotive Crane.
34 and 50 I.R. Drill Sharpeners.
24"x100' Belt Conveyor.
12-ton Milwaukee std. ga. Gas Locomotive.
8 Hummer Vibrating Screens.
60, 80, 180 & 360 HP Diesel Engines.
15-ton, 70' Boom Stiff-Legged Derrick.
750-yd. 1250-yd. & 2000-yd. Asphalt Plants.
R. C. STANHOPE, INC.
875 Sixth Ave. New York, N. Y.

FOR SALE

3000 H. P.
DIESEL ELECTRIC PLANT

4—750 HP Busch-Sulzer Engines, direct connected to 500 KW G.E. Generator, 60 cy. 3 ph. 2300 V.
1—500 KW Westinghouse 60 cy. 550 V. Rotary Converter.
1—20-ton American 8-wheel Loco. Crane, 50-ft. boom.

HYMAN-MICHAELS COMPANY
20 No. Wacker Drive
Chicago
Railway Exchange, St. Louis — 101 West 31st St., New York

GEORGE HAISS MFG. CO., Inc. **HAISS** **Park Ave. and 143rd St. New York**

Send me full details and prices on equipment checked

FACTORY REBUILT CLAM SHELL BUCKETS
☐ 3—Hayward 1¼ Yard SNOW Buckets.
☐ 1—Owen 2½ yd. Type "S Rehandling Bucket.
☐ 1—Haiss ¾ yd. Digging Bucket with teeth.
☐ 1—Haiss ¾ yd. rehandling bucket.
☐ 1—Haiss ½ yd. Digging Bucket with teeth.
☐ 1—Blaw Knox ¾ yd. Dread Naught type Bucket with teeth.
☐ 1—Haiss 1 yd. Lever Arm Bucket.

FACTORY REBUILT TRUCK LOADERS, BELT CONVEYORS, ETC.
☐ 1—Haiss 2-yd. a min. Creeper Truck Loader.
☐ 1—Haiss 25' 16" Trough Conveyor, Gas-Elec.
☐ 1—Snow Plow Model 10A Champion, 8' wide, new $80.

Name .....
Address .....

FOR SALE

2—450 Marion Diesel Electric Shovels.
3—Erie B2 1 yd. Steam Shovels.
2—20-ton 100' Boom Steel Stiffleg Derricks and 100 H.P. 3-drum Electric Hoists.
1—10-ton 80 H.P. 100' Boom Guy Derrick.
3—500 cu. ft. Chicago Pneu. Air Comp.
1—340 Sullivan Belted Air Compressor.
2—807 ft. Ingersoll-Rand XCB Compressor.
528 ft. Ingersoll-Rand Air Compressor.
1—1000 ft. Chicago Pneu. Diesel Air Comp.
1—100 H.P. Locomotive Type Boiler.
60 H.P. Clyde 2-speed Gas Hoist.
2—80 H.P. National D. C. Elec. Hoists.
6—4", 6", 8" Centrifugal Pumps.
1—15" Hoff Mang. Dredge Pumps.
24"x400' Belt Conveyor.
½-yd., ¾-yd., 1-yd. Clamshell Buckets.
3—Hayward ¾ and 1-yd. Orange Peels.
6—12 and 14-ton 36" ga. Gas Locomotives.
3—5-ton Plymouth Std. Ga. Gas Locomotives.
1—43-ton Baldwin Switching Locomotive.
30—Western 4-yd. and 5-yd. Dump Cars.
15—2-yd. V-shape Standard Ga. Dump Cars.
1—4'x12' Telsmith Vibrating Screen.
1—½-yd. Brownhoist Caterpillar Crane.
3—60 H.P. 3 ph. 60 c. 220-440 v. Elec. Motors.
2—350 H.P. Winton Diesel Units.
2—Sauerman 1-yd. Elec. Drag Scrapers.
2—1500 ft. Capacity C.P. Air Aftercoolers.
3—Ingersoll-Rand 34 & 50 Drill Sharpeners.
1—Telsmith No. 5 Crusher.

COAST-TO-COAST EQUIPMENT CORP.
101 W. 31st Street New York, N. Y.

LIQUIDATION
1—6'6"x75' Mosser Rotary Kiln, complete.
1—Raymond Midget 3-roller high side Mill.
3—No. 00, No. 0 Raymond Mills, roller bearing.
1—Allis-Chalmers No. 6K Gyratory Crusher.
1—Rotary Screen, 4'x16'.
1—Traylor Crushing Rolls, style A, 30"x14".
1—4½'x12' Abbe Tube Mill.
1—Nova 8 H.P. Gasoline Hoist.

STEIN-BRILL CORPORATION
183 Varick Street New York, N. Y.

Gardner-Denver Portable Compressor, 160'.
I.R. 2-Stage Belted Air Compressor, 446'.
Schramm 15 HP. Electric Compressor, 120'.
Hayward 1-yd. G Clamshell Material Bucket.
Owen ¾-yd. Clamshell Material Bucket.
Goulds 8" Centrif. Electric Pump, 1000 GPM.
Domestic 6" Self-Priming Cent. Pump, Buda.
Double Diaphragm 3" Electric Pump, 110 v.
300 Robins 30" Trough Idlers and Pulleys.
Trippers for 18", 24" & 30" Belt Conveyors.
Haiss-Fordson Dig. Bucket Loader, wheels.
Dake 1-Drum Hoist, 15 hp. A.C. Electric.
Clyde 3-Drum 9x10 Steam Hoist.
Johnson 50 HP. Locomotive Boiler, 125 lbs.
V-shaped Cars and Portable Track.
800 Feet New 12 lb. 18" Gauge Track.
Whitcomb 36" Gauge Locomotives, 4&7 ton.
Hummer 2-Deck 3'x5' Vibrating Screens.
Buda 35 hp. 4-cyl. Gas Engine, with pulley.
Buffalo Blower, No. 11, 40 HP, AC Motor.
G. A. Unverzagt, 15 Park Row, New York City

FOR SALE

AMERICAN 30-ton 4-wheel saddle tank locomotive, 12x18" cylinders.
VULCAN 33-ton 4-wheel saddle tank locomotive, 13x18" cylinders. (Two duplicates.)
PORTER 36-ton 4-wheel saddle tank locomotives, 14x20" cylinders, (Two duplicates.)
BALDWIN 40-ton 4-wheel saddle tank locomotives, 14x22" cylinders, (Four duplicates.)
VULCAN 40-ton 4-wheel saddle tank locomotives, 14x22" cylinders, (Two duplicates.)
AMERICAN 50-ton 4-wheel saddle tank locomotives, 16x24" cylinders, (Three duplicates.)
BALDWIN 55-ton 4-wheel saddle tank locomotive, 18x24" cylinders.
BALDWIN 60-ton 6-wheel saddle tank locomotive, 18x24" cylinders.
AMERICAN 70-ton 6-wheel switching locomotive with separate tender, 20x26" cylinders.

Complete stock list on request.

BIRMINGHAM RAIL & LOCOMOTIVE COMPANY
BIRMINGHAM, ALA.

FOR SALE

Rotary Screen, complete: 18 ft. long 45" in diameter, with eight sections ¼" to 2½" holes, with frame at both ends. Complete ready for setting up. Price $600
140 Elevator Buckets, 7" wide, 16" long and 7¼" deep. Price $160
One large Pulsometer Steam Pump. Price $100
One small Pulsometer Steam Pump. Price $50
20 Pulleys, from 2" to 4'0" in diameter, the lot. Price $150

RELIANCE WHITING COMPANY
16th St. & The Alton R. R.,
ALTON, ILL.

EXCELLENT USED EQUIPMENT
120 HP Fairbanks "VA" Full Diesel Engine.
360 HP Fairbanks "VA" 200 KW Diesel Gen. Set.
250 HP Busch Sulzer, 300 HP McIntosh Gen. Sets.
2 & 3 Drum Stm., Gas., Elec., Diesel Hoists.
MISSISSIPPI VALLEY EQUIPMENT CO.
515 Locust St. St. Louis, Mo.
Cars, Locomotives, Crushers, Compressors, Generators, Derricks, Rail, Tanks, Steel Piling

(Classified Advertising Continued on Next Page)

Continued from Preceding Page

USED EQUIPMENT

FOR SALE

FIVE
3½-yard

BLAW-KNOX AGITATORS

On Brockway Dual Pneumatic Tire Trucks, Model B T, with double high lift hoist. These machines are in first class condition and can be purchased for the sum of $1,000.00 each.

MALDEN CRUSHED STONE CO.
BROADWAY, SAUGUS, MASS.

REBUILT

2—30"x50' Link-Belt Apron Conveyors.
Telsmith Sgl. Screw Sand Washer.
48" Symons Disc Crusher.
24"x18" Jeffrey Hammer Mill.
42"x48" Jeffrey Hammer Mill.
4'6"x20' Rotary Sand Dryer.
4'9"x40' to 7'x70' Rotary Dryers.
25, 60, 80, 150, 360 HP. Diesels.
⅛, ¾, 1, 2, 4-yd. Drag Scrapers.
2-yd. Cableway or Slackline Unit.
Send for Bulletin 97—3000 Items.

MACHINERY SALES CORP. OF AMERICA
Machinery Sales Bldg.
565 W. Washington St. Chicago, Ill.

WELDING OUTFITS

$6.00 to $72.00
EASY TERMS
MONTHS TO PAY

SUPERIOR OXY-ACETYLENE MACHINE CO.
Hamilton, Ohio

ROCK PRODUCTS is the business journal of the rock products industry; its readers are men of influence, and their buying power is big. An advertisement in this classified department will be seen and read. Make your wants known and see how quickly they will be satisfied.

USED EQUIPMENT

FOR SALE
12—5-yd. 36" ga. Western Dump Cars.
6—2-yd. 36" ga. Koppel Steel V Dump Cars.
4—1½-yd. 36" ga. Insley Steel V Dump Cars.
2—3½-ton 36" ga. Whitcomb Gasoline Locomotives.
1—9x10 Sturtevant Vertical Steam Engine.
1—10x10x12 Ingersoll Steam-Driven Air Compressor.
1—9x10 Lidgerwood 3-Drum Steam Hoist.
1—8½x8 Lidgerwood S.D. Steam Hoist.
32—12-yd. Western std. ga. Air or Hand Dump Cars.
2—40-ton Baldwin S.T. Locomotives, 14x22 cyls.
Rails—First-Class Relay Rails and Bars, 60, 70, 80, 85, 90 and 100 lb. Rails, Tie Plates, etc.

HYMAN-MICHAELS CO.
20 N. Wacker Dr. Bldg., Chicago
Railway Exchange Bldg. St. Louis, Mo.
101 West 31st St. New York

Jaw Crushers—2"x6" up to 66"x84".
Crushing Rolls—12"x12" up to 54"x24"—Gyratory Crushers—No. 3 up to 42".
Ring Roll Mills — No. 0 and No. 1 — Swing Hammer Mills.
Rotary Fine Crushers—No. 1, No. 1½, No. 2.
Direct Heat Rotary Dryers—4'x30', 5'x30', 5½'x40', 6'x50', and 3½'x25'.
Semi-indirect Heat Dryers, 4'x30', 4½'x26', 5'x30' and 8½'x75'.
Cement Kilns—3' up to 9½' diameter.
Hardinge—Marcy & Fuller—Lehigh Mills.
Raymond Mills—No. 00, No. 0, No. 1 & No. 5 roll.
Tube—Rod and Ball Mills—4' to 8' diameter.
New dryers made for all purposes.
One No. 27 I-R oil furnace for drills.

W. P. HEINEKEN
95 Liberty St., N. Y. Tel.: Barclay 7-7298.

CRUSHER BARGAINS
2' Symons cone coarse bowl
2' Symons disc crusher
12"x46 Traylor gyratory type T
30"x14 Crushing rolls

BROWN-BEVIS EQUIPMENT CO.
4900 Santa Fe Ave., Los Angeles, Cal.

ELECTRIC LOCOMOTIVES
JEFFREY—GENERAL ELECTRIC—WESTINGHOUSE — GOODMAN, Shifting and Haulage types, all weights, gauges, 250-500 volts trolley, Straight Battery and Combinations.

WALLACE E. KIRK COMPANY
Incorporated
GRANT BUILDING PITTSBURGH, PA.

ELECTRICAL MACHINERY
Motors and Generators, A.C. and D.C., for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

V. M. NUSSBAUM & CO.,
Fort Wayne, Indiana

FOR SALE

Approximately 2000 ft. 6" steel water pipe with dresser couplings.

Address Box 750, care of Rock Products, 205 W. Wacker Drive, Chicago, Ill.

USED EQUIPMENT

STEAM SHOVEL

MARION NO. 70

3¼ Yard, Locomotive Type, on Crawlers.

Condition very good.
PRICE $8000

On account of recent fire we are moving our plant.

OHIO GRAVEL COMPANY
5225 Eastern Avenue
Cincinnati, Ohio

Model 49 Kennedy Gearless Fine Crusher.
6" Traylor Bulldog Crusher.
No. 00 Raymond Beater Mill.
60"x15' Revolving Screen.
60 HP, 3 Drum Gasoline Hoist.
No. 0 Raymond Pulverizer & Cyclone Separator.
1-yd. Sauerman Elec. Slackline Outfit.
540' Ingersoll-Rand Air Compressor.
1¼-yd. Marion 450 Elec. Shovel.
34x20 Jeffrey Double Roll Disintegrator.
3 F. Telsmith Reduction Crusher.
36x6 Farrel B Jaw Crusher.
5x22, 7x10, 6½x18 Tube Mills.

TIDEWATER EQUIP. & MACHY. CO.
875 Sixth Avenue New York, N. Y.

Derrick, all steel, stiff legs, 83' boom with Lambert Hoist & Swinger, A. C.....$2,500
Haiss 1-yd. Hayward 1⅝ Clamshell, ea. $250
Concrete Mfrs. (3) 2-yd. Roller bear. ea. $300
Worthington Crushing Rolls, 16x36....$650
Geared Double Rolls.....$200
7 Motors, 220-3-60 from 3-50 HP.; 2 power units, gas, 50-75 HP.; 60' bucket elevator, 12" buckets; ball bear. idlers; steel cars (100) roller bear.; 24" ga. portable track.
Address Box No. 753, care Rock Products, 205 W. Wacker Drive, Chicago, Ill.

Hummer Vibrating Screens and Generators
4x5' Double Deck V-16 Vibrators.
4x10' Tandem Unit 1 Deck 2—V-32 Vibrators
8x7' Double Unit 1 Deck 4—V-32 Vibrators.
4x5' Double Unit 2 Decks 2—V-32 Vibrators.
Tyler Motor Generators 8 KVA 15 cyc. 110v.
Complete Hummer Start & Operate Equipment

G. A. UNVERZAGT
15 Park Row New York City

NEW HOLLOW DRILL STEEL
BARGAIN PRICES
100,000 lbs. 1", 1¼" and 1¼" HOLLOW DRILL Steel, Round, Hexagon and Quarter Octagon. Best known SWEDISH Brands. Write for prices.

Marine Metal & Supply Co.
167 South Street New York City

EARTH MOVING EQUIPMENT
AT SACRIFICE PRICES

5—La Plante Choate Model DW-6 all steel dump wagons, 6 yd. cap. Mounted on 4 steel disc wheels.

4—La Plante Choate Model DW-3 all steel dump wagons, 3 yd. cap. Mounted on 4 steel disc wheels.

9—Pairs of Athey Truss Wheel caterpillar assemblies with axles—10 ton cap.

10—Little Red Wagon Company 2 yd. wood body, 4 wheel wagons with 12 ft. wagon poles and foot brakes.

2—Martin 15 ton cap. 8 wheel log wagons complete with bolsters, reach rod and tongue for tractor hitch.

6—Killefer roll over scrapers:
2—27 cu. ft. cap. 29″ wide.
4—21 cu. ft. cap. 26″ wide.

"Send for our Latest Stock List"

EQUIPMENT CORPORATION OF AMERICA

PHILADELPHIA—P. O. Box 5419, Kingsessing Sta. Phone Granite 7600
CHICAGO—1119 S. Washtenaw Ave. Phone Nevada 2400
PITTSBURGH—P. O. Box 933 Phone Federal 2000

USED EQUIPMENT

RAILS AND CARS
All weights, new and used rails, 12 lbs. to 100 lbs. Portable track, drier cars, all gauges—"V" shape and Western Cars. In centrally located warehouses. Wire or write for prices.
M. K. FRANK
480 Lexington Ave., New York City
P. O. Box 1234, Pittsburgh, Pa.

CARS
12-Yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars, Locomotives.
HYMAN-MICHAELS COMPANY
20 N. Wacker Dr. Bldg., Chicago, Ill.
Railway Exch. Bldg., St. Louis, Mo.
101 West 31st St., New York

USED EQUIPMENT WANTED

WANTED TO BUY
8-foot GAYCO MECHANICAL AIR SEPARATOR
EL PASO IRON & METAL COMPANY
EL PASO, TEXAS

WANTED
A shovel attachment complete for Byers Bearcat Crane. Advise price, location and condition.
THE GIBSONBURG LIME PRODUCTS CO.
Gibsonburg, Ohio

WANTED
6′ Sturtevant or 5′ Gayco Centrifugal Air Separator.
BOX 749, ROCK PRODUCTS
205 W. Wacker Drive, Chicago, Ill.

USED EQUIPMENT WANTED

WANTED
Gruendler Crusher, Model 6X3B or equivalent, capacity 10 to 12 tons per hour, to take rock up to 75 lbs. Must be in good operating condition.
W. I. DENNY
618 West Lake St., Chicago

POSITIONS WANTED

RESEARCH ENGINEER, M.E., American citizen, single, employed, six years as physical chemist, grinding plant and burning research in large cement plant. Experience in inorganic chemistry, physical testing, combustion and fuel engineering, drafting, economic investigations. Desires permanent position in industrial or research work in a progressive organization, cement preferred. Address Box 751, care of Rock Products, 205 W. Wacker Dr., Chicago, Ill.

RESPONSIBLE SALESMAN ACQUAINTED with Dealers and Contractors in Eastern and Central Pa., seeking position contacting that trade. Excellent references, capable and efficient. Address Box 747, care of Rock Products, 205 W. Wacker Drive, Chicago, Ill.

POSITION WANTED AS SUPERINTENDENT with a progressive stone company. 20 years' experience operating limestone quarries and crushing plants; familiar with all modern equipment; efficient handling of labor with record of low cost of production; qualified to assume full charge of any size plant or plants; unquestionable reference. Open for engagement. Address Box 746, care Rock Products, 205 W. Wacker Dr., Chicago, Ill.

WANTED—Position where there is opportunity for advancement. Unusually broad experience includes operating, engineering, and manufacturing in metallic, lime, and gypsum industries. Knowledge of sales, costs, and warehousing. Technical graduate of leading engineering university, at present employed as superintendent of a large quarry. Age 32, married. Available on 30 days notice. Box 752, care of Rock Products, 205 W. Wacker Dr., Chicago, Ill.

CONSULTING ENGINEERS

H. J. BROWN
CONSULTING ENGINEER
85 Doane Street, Boston, Massachusetts
Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.
Consultation, Examinations, Reports
Design, Construction, Supervision

WE LOOK INTO THE EARTH
By using Diamond Core Drills
We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.
PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

H. D. RUHM
Consulting Engineer
Dealer in PHOSPHATE LANDS and all grades of rock.
10-mesh PHOSPHATE FILLER, $3.00 net ton
40 years' experience TENNESSEE PHOSPHATE FIELD. Correspondence solicited. Can find what you want if it can be found.
305 West Seventh St., Columbia, Tennessee

POSITIONS WANTED

SALES OR ENGINEERING POSITION with Rock or Mineral Wool company. Graduate School Mechanical Engineering Purdue University. Four years sales mgr. General Insulating and Mfg., Alexandria, Ind. Several years with Wabash Rock Wool concerns. Experience in sales, engineering and advertising. 44 years of age, excellent health. G. S. JONES, 216 W. Church St., Alexandria, Ind.

POSITIONS VACANT

CHIEF CHEMIST WANTED. OPENING exists in dry process cement plant in Southwest. Applicant should give full particulars, stating age, experience and salary expected. Address Box 748, care of Rock Products, 205 W. Wacker Drive, Chicago, Ill.

The Cleveland DR-6 *leads them all*

In Adaptability to all sorts of drilling positions and conditions. Any angle—any direction. Wheels swivel.

In Convenience of Operation. Easily and quickly changed from one position to another —Throttle and blowing controls conveniently located, and always in the same place. Continuous air feed — easy to change steels.

In Drilling Speed. 800 to 1,000 feet of holes per day per machine commonly reported.

In Blowing Power. Blows with that sudden "Blast" that cleans out all the dirt.

In Portability. Readily towed behind a light truck or automobile. Standard road gauge, but can be set to 16" narrower for close places.

In Economy. Requires less air. Repairs less than any other make of drilling rig.

In Originality. First to use pneumatic tires. First to use the frame as an air receiver. First to use long air feed. First to be able to drill at any angle.

Bulletin 111 tells you how to save on drilling costs.

BRANCH OFFICES

Birmingham, Ala., 1304-6 North First Ave.
Butte, Mont., 41 East Broadway.
Chicago, Ill., 549 West Washington St.
Denver, Colo., 760 Downing Street.
El Paso, Tex., 1417 Texas Street.
Los Angeles, Calif., 2001 Santa Fe Ave.
Martinsburg, West Va., 100 South Raleigh St.
Michigan, 222 Heath St., Negaunee.
New England, 457 Washington St. Newton, Mass.
New York City, 200 Church St.
Richmond, Va., 12 North 15th St.
Salt Lake City, 501 Dooly Bldg.
San Francisco, Folsom at 17th St.
St. Louis, Mo., 1375 Railway Exchange Bldg.

THE CLEVELAND ROCK DRILL CO.

3738 EAST 78th STREET CLEVELAND, OHIO

Cable Address. *"ROCKDRILL"*

LEADERS IN DRILLING EQUIPMENT